Clean Coal Power Initiative

Round 1 Proposers

Public Abstracts

The opening round of the Department of Energy's Clean Coal Power Initiative solicitation resulted in 36 private sector proposers submitting candidate projects valued at more than $5 billion with more than $1 billion in federal cost sharing requested from DOE. These descriptions (in the form of project abstracts) were provided by the applicants and are not intended to reflect the opinions or endorsements of the Department of Energy.

Clean Coal Power Initiative - Round 1 Proposers

A description of each of these projects can be found at http://www.netl.doe.gov/coalpower/ccpi/index.html

Proposer	Project Title	Proposed Financing [In Millions] DOE	Other	Total	Proposed Project Site
ADA Environmental Solutions, LLC, Littleton, CO	Demonstrating the Multi[3] Multi Pollution Control System	76.1	76.1	152.2	Salem, MA
Alaska Industrial Development and Export Authority, Anchorage, AK	Slagging Combustor Testing and Commercialization	35.7	55.2	90.9	Healy, AK
AmerenUE, St. Louis, MO	Electro-Catalytic Oxidation Emissions Control Technology	73.0	73.0	146.0	West Alton, MO
Clean Energy Systems, Inc., Sacramento, CA	A 20-Megawatt Zero Emission Coal-Fired Demonstration Plant	54.9	54.9	109.8	TBD - Multiple candidate sites
Colorado Springs Utilities, Colorado Springs, CO	Next-Generation Circulating Fluidized Bed Coal Generating Unit	30.0	271.5	301.5	Fountain, CO
Emery Energy Co., Salt Lake City, UT	Emery Gasifier for Clean Coal Power Applications	66.0	66.0	132.0	TBD
EnviRes, LLC, Lexington, KY	Clean Coal Power Initiative (Gasification/ Combined Cycle Plant)	31.6	41.2	72.8	East St. Louis, IL
EnviroScrub Technologies Corp., Minneapolis, MN	EnviroScrub One Step SOx/NOx Reduction Technology	12.5	12.5	25.0	Cohasset, MN
FuelCell Energy Inc., Danbury, CT	High-Efficiency Clean Coal Fuel Cell/Turbine Power Plant Demo.	16.0	16.0	32.0	Danbury/Torrington CT & Wilsonville, AL
Great River Energy, Underwood, ND	Lignite Fuel Enhancement Commercial Application	11.0	11.0	22.0	Underwood, ND
Green Coal LLC, Nashville, TN	Green Coal Treatment Plant	3.8	3.8	7.6	Pearl, IL
Green Earth Industries, LLC, Dulles, VA	Effect of Amino Acids on Coal Bed Methane Production	0.3	0.3	0.6	Dulles, VA
Green Earth Industries, LLC, Dulles, VA	Effect of Amino Acids on Coal Purifying Bacteria	0.5	0.5	1.0	TBD
Harrison R. Cooper Systems, Inc., Bountiful, UT	Improved Boiler Performance Through On-Line Coal Analysis	0.2	0.2	0.4	Colorado Springs, CO / Fairbanks, AK

Indianapolis Power & Light Co., Indianapolis, IN	The Clean Combustion System™ Demonstration	13.2	14.4	27.6	Indianapolis, IN
Kentucky Mountain Power, Lexington, KY	Baseload Coal and Gob Fired Electric Generating Facility	60.0	676.0	736.0	Kentucky
LG&E Energy Corp., Louisville, KY	Demonstration of the Airborne Process (Multi-Pollutant Control)	31.1	89.0	120.1	Carrollton, KY
McDermott Technology Inc., Alliance, OH	Cliffside Optimal Multi-Pollutant Abatement System	74.3	74.3	148.6	Cliffside, NC
NeuCo, Inc., Boston, MA	Integrated Optimization Software at the Baldwin Energy Complex	8.4	10.2	18.6	Baldwin, IL
Nissho Iwai American Corp., New York, NY	Upgraded Brown Coal Beneficiation Process	28.4	28.4	56.8	Wright, WY
Nordic Energy of Ashtabula, LLC, Ann Arbor, MI	Ashtabula Advanced Gasification Coproduction Facility	150.0	1080.0	1230.0	Ashtabula, OH
N-Viro International Corp., Toledo, OH	Environmental & Economic Evaluation of a Biofuel Coal Additive	0.5	0.5	1.0	North Bend, OH East Lansing, MI
Ohio University, Athens, OH	Advanced Coal Gasification Combined Heat & Power Facility	67.0	67.0	134.0	Athens, OH
Phoenix Materials Co., Grand Rapids, MI	Phoenix Materials Co. Concrete Production (using fly ash)	5.2	5.8	11.0	West Olive, MI
Robinson Run Power LLC, Needham, MA	Dry Absorption Process (Emission Control)	12.0	12.3	24.3	Monongalia County, WV
Silverado Green Fuel, Inc., Fairbanks, AK	Clean Coal Power Generation w/Low-Rank Coal-Water Fuel	9.7	14.3	24.0	Fairbanks North Star Borough, AK
Southern Company Services, Birmingham, AL	300-MW Demonstration of Coal Gasification Power Generation	250.0	469.5	719.5	TBD - Multiple candidate sites
Stolar Research Corp., Raton, NM	Demonstration of Upstream Clean Coal Technology	1.0	1.4	2.4	TBD
SRT Group, Inc., Miami, FL	SRT/ISPRA Flue Gas Desulphurization Process	3.7	3.7	7.4	Farmington, NM

Tampa Electric Company, Tampa, FL	NOx Removal and Reduction Project for Coal-Fired Power Plants	38.0	56.9	94.9	Apollo Beach, FL
Universal Aggregates, LLC, Bridgeville, PA	Demonstration of the Manufactured Aggregates Technology	10.3	15.4	25.7	Lakeland, FL
University of Kentucky Research Foundation, Lexington, KY	Advanced Multi-Product Coal Utilization ByProduct Processing	4.4	4.5	8.9	Ghent, KY
Western Greenbrier Co-Generation LLC, Lewisburg, WV	Clean Coal Co-Production Power Plant	107.5	107.5	215.0	Rainelle, WV
Wisconsin Electric Power Co., Milwaukee, WI	TOXECON Retrofit for Mercury and Multi-Pollutant Control	24.8	24.8	49.6	Marquette, MI
WMPI PTY., LLC, Gilberton, PA	Gilberton Coal-to-Clean Fuels and Power Co-Production Project	100.0	512.0	612.0	Gilberton, PA
Xiong Cheng-Rui	An Igniting and Self-Stabilized Pulverized Coal Burner	0.2	--	0.2	TBD
		1411.3	3950.1	5361.4	

TBD - To Be Determined

- End of Project Listing -

PUBLIC ABSTRACT

Applicant (primary) name: **ADA Environmental Solutions, LLC**

Applicant's address: **8100 SouthPark Way, B-2, Littleton, CO 80120**

Team Members **ADA-ES**
USGen New England INC. ("USGenNE")
Energy and Environmental Strategies

Proposal Title: **"Demonstrating the Multi^3 Multi Pollution Control System"**

Commercial Application: ☐ New Facilities ☒ Existing Facilities

Technology Type: **Fossil Energy R&D, Air Pollution Control from Coal-Fired Power Plants**

Total Estimated Cost: $152,192,588

Estimated DOE Share: $76,096,294

Estimated Private Share: $76,096,294

Anticipated Project Sites: **USGenNE**
Salem Harbor Station
24 Fort Ave.
Salem, MA 01970-5623

Type of coal to be used: **Low-Sulfur Bituminous**

Size or scale of project: **315 MW Total (Unit 1 = 84 MW, Unit 2 = 81 MW, Unit 3 = 150 MW net)**

Duration of proposed project: **60 months**

PRIMARY CONTACT:
For additional information,
Interested parties should contact: **Michael D. Durham, Ph.D.**
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Vice President
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Brief description of project:

Many coal-fired power plants are considering installing pollution controls for air pollutants such as sulfur oxides, nitrogen oxides, mercury and particulates. Many of the power generating units at these plants are relatively small in size, with more than 50% being 200 MW in capacity or less. This class of generating unit produces about 40,000 MW of the nation's electricity and this capacity can continue to be productive, but only if cost-effective pollution controls are installed.

The proposed project will be conducted at USGenNE's Salem Harbor Station (Salem, MA) and focuses on designing, installing and demonstrating a single multi-pollution control system known as Multi^3 that will treat the emissions from three small generating units. Significant capital costs are saved using this unique multiple unit emission control approach. This approach is particularly suited for sites that are constrained by equipment configuration and/or by the amount of real estate that is available for installing additional equipment. The project will also demonstrate a novel process for treating fly ash to produce a product suitable for concrete.

The overall objective of this project is to demonstrate an integrated multi-pollutant control system on three Salem Harbor coal-fired boilers. The system will consist of state-of-the-art NO_x controls, acid gas controls, mercury controls, particulate controls, ash processing facilities, and an integration system composed of advanced sensors and software.

Specific objectives of the project are:

- Demonstrate NO_x emission levels to below 0.10 lb/Mbtu;
- Demonstrate SO_2 emissions levels to below 0.15 lb/Mbtu;
- Demonstrate 90+% mercury capture from inlet levels;
- Utilize 100% of the ash captured by the ESPs;
- Reduce emissions of acid gases and fine particles significantly;
- Successfully utilize recycled wastewater in the SDA;
- Modify, install and demonstrate new process and/or emissions monitors; and
- Successfully integrate the entire system so that all subsystems are operating at peak performance.

The scope of work covers five Phases over a five year period. Phase 1 covers a one year time period for preliminary design and permit acquisition functions. Phase 2 also covers one year and involves final design of the various subsystems. Phase 3 is devoted to installation and construction and will cover a period of 18 months. Demonstration activities will occur during the 18-month Phase 4 period. System operation, performance, optimization, and integration functions will be reported. Phase 5 is reserved for reporting and project management functions and spans the full 5-year project schedule.

The proposed project meets most of the stated DOE CCPI objectives in a single project:

Reducing Emissions

- Mercury control (ESP plus SDA/FF combination,)
- NO_x control using clean-side SCR
- SO_2 control using SDA
- PM control using existing ESPs and new baghouse
- Acid gas control using the SDA and baghouse

Multi-Pollution Control

- The project ties all pollution controls into a single integrated unit

Byproduct Utilization, Treatment and Disposal

- Fly ash beneficiation with integrated mercury control technology
- The baghouse will allow possible reuse of SDA products
- Assessment of how powdered activated carbon, or other sorbents affect combustion byproducts

Water Utilization and Conservation

- Proposed use of recycled water from a neighboring publicly owned treatment facility in the SDA

Innovations to be Demonstrated

- Single SCR-SDA-Baghouse to treat multiple units

- ESP/SDA/Baghouse configuration
- Clean-side SCR
- Use of recycled water in SDA
- Ash beneficiation and utilization

Benefits of the project include: 1) providing the industry with a proven and cost effective retrofit or upgrade for existing power plants to meet multiple pollution control regulations, 2) providing the regulatory community with broader information upon which to establish regulatory frameworks, 3) providing information that power companies can use in their strategic planning to meet future control requirements, and 4) providing for the continued clean use of coal, a significant source of U.S. energy and national security.

List of Acronyms

ESP	Electrostatic Precipitator
FF	Fabric Filter
SDA	Spray Dryer Absorber
SCR	Selective Catalytic Reduction
DOE	Department of Energy
CCPI	Clean Coal Power Initiative

PUBLIC ABSTRACT

Applicant (primary) name: Alaska Industrial Development and Export Authority (AIDEA)

Applicant's address:	813 West Northern Lights Blvd.,	Anchorage,	AK	99503
	Street	City	State	Zip code

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

TRW	Cleveland,	OH	44193
Name	City	State	Zip code
B&W/Joy	Babberton,	OH	44203
Name	City	State	Zip code
Foster Wheeler	Clifton,	NJ	08809
Name	City	State	Zip code
Harris Group Inc.	Denver,	CO	80202
Name	City	State	Zip code
Steigers Corporation	Centennial,	CO	80111
Name	City	State	Zip code
Framatome DE&S	Lynchburg,	VA	24506
Name	City	State	Zip code
D.V. McCrohan	Sparks,	NV	89436
Name	City	State	Zip code
Jack Hardgrove	San Juan Capistrano,	CA	92690
Name	City	State	Zip code

(Use continuation sheet if needed.)

Proposal Title: Slagging Combustor Testing And Commercialization Project (SCTCP)

Commercial Application: [X] New Facilities [ ] Existing Facilities

Other, Specify:

Technology Type: TRW Clean Coal Combustion System and Babcock & Wilcox/Joy Spray Dryer Absorber (SDA) System

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 90,935,700

Estimated DOE Share: $ 35,697,860

Estimated Private Share: $ 55,237,840

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s): Healy, (Location (city, county, etc.)) Alaska (State) 99743 (Zip code)

Location (city, county, etc.) State Zip code

Location (city, county, etc.) State Zip code

Type of coal to be used: Waste coal from Usbelli Mine (Primary) Midwestern High Sulfur Coal (Alternate (if any))

Size or scale of project: 1,200 T/Day (Tons of coal/day input)

And/or

Other (if necessary) Megawatts, Barrels per day, etc.

Duration of proposed project: 42 Months (From date of award) (Months)

PRIMARY CONTACT:
For additional information, interested parties should contact:

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Sparks, NV 89436
City State Zip code

PUBLIC ABSTRACT

SLAGGING COMBUSTOR TESTING AND COMMERCIALIZATION PROJECT (SCTCP)

Alaska Industrial Development and Export Authority (AIDEA) proposes partnering with the U.S. Department of Energy to test and commercialize the Clean Coal slagging combustor technology and the associated Babcock & Wilcox Joy SO_2 scrubber system (the Technology). The Technology integrates air pollution control processes designed to minimize emissions of NO_x, SO_2, CO, and particulates, while firing a broad range of coals. A commercial-scale facility incorporating the Technology was installed in response to a DOE Program Opportunity Notice issued in May 1989 for the Clean Coal Technology Program and was preliminarily tested at the Healy Clean Coal Project. Under the original demonstration program, the full range of testing needed for technology optimization and commercialization was not completed during the prescribed time frame. The SCTCP will improve and fully test and optimize the Technology to demonstrate its full environmental and commercial potential.

Technology highlights include:

- State-of-the-art fuel and air-staged combustion processes that generate low NO_x and CO relative to competing technologies, including low-NO_x burners and cyclone boilers;
- Three-stage sulfur removal process involving reaction of lime with SO_2 within the furnace, resulting in low SO_2 emissions;
- Innovative design incorporating precombustion and slagging combustion chambers and pneumatically-based coal feed systems that enable firing of widely varying coal types;
- High carbon burnout capabilities (up to 99%), resulting in increased boiler efficiency versus cyclone units and production of high-quality ash.

SCTCP will pursue the following objectives and goals:

1) Demonstrate unit reliability while burning waste coal (88% capacity factor)
2) Minimize NO_x emissions (0.20 lb/MMBtu without SNCR, 0.12 with SNCR)
3) Increase plant power efficiency (efficiency 1% greater than cyclone boiler)
4) Estimate mercury removal
5) Minimize SO_2 removal system lime consumption (90% removal, 50% in furnace)
6) Demonstrate unit economic viability (3.80 cents/kWh production cost)
7) Affirm low CO and particulate emissions
8) Evaluate technical and economic benefits of bottom and fly ash

To achieve these objectives, the SCTCP will involve system testing and modification of several key system components in a series of phased capital improvements.

Technology benefits include:

- Application in new construction or for retrofits of existing industrial and utility scale coal- and oil-fired boilers to reduce NOx emissions, which will enable achievement of environmental compliance with no or minimal additional NO_x control. In areas with strict emission limits, selective noncatalytic reduction (SNCR, which will be tested during the SCTCP) may be sufficient to reduce remaining NO_x to acceptable levels instead of its more expensive counterpart selective catalytic reduction (SCR).

- Unprecedented ability to burn coals with widely varying properties that will create a market for otherwise unusable waste coals, high-sulfur coals, and fines. Many existing boilers are geographically positioned in areas with nearby but undesirable coal sources (waste coal in Pennsylvania and West Virginia and high sulfur coal in Illinois, Ohio, and other Midwestern states); these facilities often purchase high-moisture coal from Western sources over 1,000 miles away. In addition to the environmental and operating costs associated with such transportation, energy is required to offset the high moisture content of these coals, leading to lost efficiency and associated increases (up to 10%) in greenhouse gas emissions. Retrofitting a facility with the Technology will allow use of local high-sulfur and waste coals as fuel, reducing transportation and fuel costs, and eliminating energy penalties. These benefits can be realized by aging cyclone boilers at relatively low cost because of similar equipment configurations. There are approximately 62 operating cyclone boilers in Eastern and Midwestern U.S with combined capacities of 23,000 MW. Burning waste coal can also help rid local landscapes of unsightly waste coal piles and attendant environmental problems. Environmental and economic benefits extend internationally to countries with large quantities of low-quality coal such as China, Russia, and India, where U.S. companies can market the Technology.

- High carbon burnout that results in increased boiler efficiency compared to cyclone boilers and reduced operating costs. Resultant ash material is generally higher in quality than ash from typical coal-fired plants and can be readily incorporated into concrete mixtures, structural fill, or as a component of road base, reducing solid waste disposal problems.

Summary:

The SCTCP will be an important step towards achieving the goals of President Bush's Clear Skies Initiative while simultaneously realizing many other environmental and economic benefits and adding to the stability and security of the nation’s energy supply by providing a means for utilizing abundant fuel resources that might otherwise be considered unusable.

PUBLIC ABSTRACT

Applicant (primary) name: EnviroScrub Technologies Corporation

Applicant=s address: 1650 W 82nd Street, Suite 650
Minneapolis MN 55431
Street City State Zipcode

Team Members (if any): John von Steinbergs Excelsior, MN 55391
(listing represents only participants at time of application, not necessarily final team membership)
Name City State Zipcode

Charles F. Hammel Escondido, CA 92027
Name City State Zipcode

Kevin P. Kronbeck Baxter, MN 56425
Name City State Zipcode

Richard Boren Bakersfield, CA 93312
Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: EnviroScrub One Step SOx/NOx Reduction Technology

Commercial Application: XX New Facilities XX Existing Facilities

9 Other, Specify: _____

Technology Type: Environmental

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 25,051,986

Estimated DOE Share: $ 12,525,993

Estimated Private Share: $ 12,525,993

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Cohasset, Itasca County, MN 55721

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Sub-bituminous Powder River Basin

Primary Alternate (if any)

Size or scale of project: 269 tons/day
Tons of coal/day input

And/or

Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 24
(From date of award) (Months)

PRIMARY CONTACT:

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Name

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PUBLIC ABSTRACT (cont=d)

Brief description of project:

(750 words or less. Use continuation sheet if necessary)

EnviroScrub Technologies Corporation, a Minnesota corporation, is a deployment-stage company engaged in the development of the *Pahlman Process*™ technology, a multi-pollutant control (MPC) process supported by US and international patent filings. The *Pahlman Process*™ removes oxides of nitrogen (NO_X) at greater than 99% removal efficiencies, oxides of sulfur (SO_X) at greater than 99% removal efficiencies, elemental and oxidized (Hg) at greater than 65% removal efficiencies from gas streams of coal fired and other industrial processes. Minnesota Power is also a Minnesota Corporation, whose primary business is generating and selling electricity that is primarily produced from coal. EnviroScrub, in cooperation with Minnesota Power, seeks to further develop the *Pahlman Process*™ technology to a commercial stage.

The proprietary *Pahlman Process*™ technology removes pollutants from emission gases using EnviroScrub's proprietary *Pahlmanite*™ *sorbent*, regenerable and reusable compounds. The Pahlmanite sorbent is regenerable and can be regenerated and reused many times over. The *Pahlman Process*™ technology includes dry, regenerable methods of NO_X and SO_X, emissions reduction from industrial process flue gases. Unlike selective catalytic reduction ("SCR"), an ammonia gas (NH_3) based NO_X scrubbing process, and flue gas desulfurization ("FGD"), a "once-through" limestone-based SO_2 scrubbing process, the *Pahlman Process*™ technology is capable of removing both NO_X and SO_X gases with a single process. Further, the *Pahlman Process*™ technology represents true zero-ammonia (NH_3)-technology ("ZAT") for NO_X scrubbing applications and is not a "once-through" scrubbing method.

A significant amount of research has been completed with the EnviroScrub's prototype facility which is mounted on a 40 foot trailer. The research has clearly proven that the *Pahlman Process*™ technology is extremely effectively for NO_X and/or SO_X removal. The use of a bag house has worked well as a reaction chamber in the prototype. The results of EnviroScrub studies using a bag house, a fluidized bed and a spray injection system indicate that a spray injection system is likely the best method of delivering *Pahlmanite*™ *sorbent* to the flue gas stream. In this application for Clean Coal Technologies Initiative funds, we are requesting funds to construct the first commercial sized *Pahlman Process*™ Plant. It will be a retrofitted 20 MW sized facility using a spray injections system which will be placed in parallel with the existing pollution control equipment on Minnesota Power's Boswell Unit 1, a 75MW coal-fired generator located in Cohasset, Minnesota.

Indications are that the *Pahlman Process*™ technology removes NO_X SO_X, and Hg compounds from gas streams more efficiently, and more cost effectively, than current best-available-controltechnology ("BACT"). EnviroScrub is seeking federal funding in order to further develop and commercialize its highly effective pollution control technology and demonstrate on a large scale the BACT-like efficiency of the *Pahlman Process*™ technology.

PUBLIC ABSTRACT

Applicant (primary) name: Emery Energy Company

Applicant=s address: 444 East 200 South, Salt Lake City, UT 84111
Street City State Zipcode

Team Members (if any): Reaction Engineering International (REI);
(listing represents only participants Name City State Zipcode
at time of application, not necessarily final team membership) Idaho National Engineering and Environmental Laboratory (INEEL); Saint Gobain Industrial Ceramics; Fluor Daniel; Pinnacle West Capital Corporation; State of Utah, Office of Energy Services

(Use continuation sheet if needed.)

Proposal Title: Emery Gasifier for Clean Coal Power Applications

Commercial Application: XX New Facilities X Existing Facilities

9 Other, Specify: _____

Technology Type: Gasification/Synthesis Gas Cleaning

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 132 million

Estimated DOE Share: $ 66 million

Estimated Private Share: $ 66 million

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): To be determined
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Bituminous
Primary

Alternate (if any)

Size or scale of project: 575 tons of coal per day
Tons of coal/day input

And/or

70Mwe net
Other (if necessary)

Megawatts, Barrels per day, etc.

Duration of proposed project: 92
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Name

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PUBLIC ABSTRACT (cont=d)

Brief description of project:

Commercial use of coal gasification has been limited by high unit costs related to technical challenges, such as the need for costly and regular replacement of ceramic refractory and burners, costly and energy intensive downstream equipment to clean and condition the synthesis gas (syngas) for the intended use, limited fuel/coal flexibility, high operating costs, and the need for expensive air emission control equipment. Our proposed project addresses these technical challenges and it will position coal gasification technology to become economically competitive with other coal-based power processes and natural gas combined cycle systems, enhancing the acceptability of IGCC systems and support economical use of domestic coal resources.

Emery's oxygen-blown, pressurized gasifier that can operate in slagging or non-slagging modes. It combines both fixed-bed and entrained-flow gasification processes into one vessel, while emphasizing the benefits of each technology type and mitigating their downsides. Emery's phased project has critical go/no go decision points that allow the proper sequential development of the technology to support commercial scale demonstration. The successful development and commercialization of this novel approach will broadly benefit both the coal and power industries by providing highly competitive power prices. Uniquely, the Emery technology will allow for IGCC plants to be built economically at smaller scales (i.e. 70 – 200 MWe) than current commercial coal gasification technologies. Conversely, current gasification technologies required coal-based IGCC to be extremely large to reach economies of scale. This will allow the technology to penetrate a large market related to Brownfield re-powering opportunities, as well as being economically viable for larger scale installations (i.e. >500 MWe).

Principle benefits to be realized for the gasification and coal power industry are based on the novel Emery Gasifier configuration. These features cited below, combined with modest efficiency gains over other gasification processes, result in significant capital and O&M savings, which are key to commercialization and market acceptance.

- Simplify plant configuration and lower capital costs of IGCC plants by >20%
- Reduced wear on ceramic lining, which greatly increases refractory life and mitigates costs associated with refractory replacement
- Develop novel syngas cleaning processes for removal of sulfur, mercury, arsenic and other non-desirable species that could eliminate or reduce the size of traditional downstream gas cleanup – resulting in the ability to significantly lower the capital and O&M costs of gasification plants
- Duel feed capability of both coarse and pulverized coal, greatly enhancing fuel flexibility and creating the ability to co-gasify biomass (a coarse feedstock) with coal
- Produce electric power at rates competitive to other alternatives, including NGCC

This project builds on past pilot plant work conducted in central Utah at our 25-ton/day gasification facility and our recent conceptual design research completed under EERE contract number DE-FC26-01NT41351, Biomass Gasification Feasibility/Modeling Study, in which computer modeling of the proposed gasifier plant design projected overall system performance efficiencies of 40.8% and 53.5%, biomass-to-electricity, respectively, when used in Integrated Gasification Combined Cycle (IGCC) and Integrated Gasification Fuel Cell (IGFC) configurations. Emery also ran 4 coal cases to compare efficiency differences and to identify any process plant changes necessary to support syngas production for the combined cycle power plant using the GE MS6001B turbine. Both GE Power Systems and the INEEL supported modeling and efficiency evaluation during this study. Results showed 42.3% net plant efficiencies when used in relatively small (70MWe) IGCC power plant applications with the GE MS6001B turbine on Bituminous coals. Installations sized to larger gas turbines (i.e. GE "H" frame or Westinghouse turbine developments) will allow for even higher net plant efficiencies.

This project consists of further development necessary to validate recent work and projections and advance this innovative technology from conceptual design to commercialization. The project includes: **PROJECT DEFINITION** (1) Development of an integrated computer model that accounts for all significant interdependent chemical reactions and physical processes to validate gasifier performance; (2) Conducting laboratory bench-scale tests to obtain certain data not available in the literature. The bench-scale test focuses on developing chemical reaction and product characterization data unique to this gasifier configuration to validate models and support the Phase 3 tests; (3) Conducting integrated mockup tests at nominally 150 pounds per hour feed rate to achieve appropriate integration of the heat transfer, fluid flow, and kinetic processes and provide scalable data for pilot plant design; (4) Validate Gasifier Design and Evaluate Overall System Performance in a pilot scale gasifier (~70 tons/day); (5) Financial/economic model to determine best near-term power applications for the technology and selection of final gasifier vessel configuration for the commercial demonstration; **COMMERCIAL DEMONSTRATION**: (6) Design, construction and operation of the demonstration plant (70 MWe; 575 tons of coal/day).

PUBLIC ABSTRACT

Applicant (primary) name: Colorado Springs Utilities, an enterprise of the City of Colorado Springs, a Colorado home rule city and municipal corporation

Applicant s address: 121 S. Tejon Street, Colorado Springs, CO 80903
Street City State Zipcode

Team Members (if any): Foster Wheeler Power Group, Inc.

Perryville Corporate Park, Clinton, NJ 08809-4000
Name City State Zipcode

(listing represents only participants at time of application, not necessarily final team membership)

_____
Name City State Zipcode

_____
Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Next-Generation CFB Coal Generating Unit

Commercial Application: X New Facilities
__Existing Facilities

Other, Specify:

Technology Type: Advanced Low-Emission CFB Combustion System

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 301,504,000

Estimated DOE Share: $ 30,000,000

Estimated Private Share: $ 271,504,000

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s): Fountain, El Paso County, Colorado 80817-3800
Location (city, county, etc.) State Zipcode

Type of coal to be used: Sub-Bituminous PRB (Primary); PRB blended with coal waste, biomass, petroleum coke (Alternate (if any))

Size or scale of project: 2,200
Tons of coal/day input

And/or

150 megawatts Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 72
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact:

Jay Francis
Name

Principal Engineer
Position

(719) 668-5634
Telephone Number

Colorado Springs Utilities
Company

jfrancis@csu.org
e-mail address

215 Nichols Blvd. , M/C 1328
Address

Colorado Springs, CO 80907
City State Zipcode

Alternative Contact:

Phillip Saletta
Name

Managing Engineer
Position

(719) 668-8713
Telephone Number

Colorado Springs Utilities
Company

psaletta@csu.org
e-mail addressAddress

215 Nichols Blvd, M/C 1328,

Colorado Springs, CO 80907
City State Zipcode

PUBLIC ABSTRACT (cont'd)

Brief description of project:

Next-Generation CFB Coal Power System Technology Demonstration

Colorado Springs Utilities (CSU) and Foster Wheeler (FW) are joining to achieve unprecedented low plant emissions levels in a coal generating unit. Circulating fluidized bed (CFB) combustion technology is being combined with fully integrated, multi-layered emission control technology to produce what is expected to be the cleanest coal unit in the world, while maintaining cost competitiveness and high unit reliability.

CSU and FW will demonstrate this new technology with a full-scale, 150 megawatt commercial generating unit at the Ray D. Nixon Power Plant, south of Colorado Springs. This new generating unit will provide CSU's customers with low-cost electric power, while furthering CSU's goal of environmental stewardship.

For oxides of nitrogen (NO_x), the system features an advanced staged-combustion process that can achieve unprecedented low furnace NO_x levels, coupled with an advanced selective non-catalytic reduction (SNCR) system that can reduce stack NO_x levels achievable today only with higher cost SCR technology.

For oxides of sulfur (SOx), to break through the current limit of limestone utilization for the CFB, the design features a three-stage approach to achieve the highest sulfur capture with the lowest limestone consumption. Unlike other processes, the limestone fed to the furnace is the only source of reagent added for sulfur removal. This system is expected to achieve a 96% to 98% sulfur removal, while reducing limestone consumption to less than half of conventional CFB systems.

In addition to the advanced SO_x and NO_x control technology, the advanced low emission combustion system features an integrated trace metal control system that can remove up to 90% of mercury, lead and other metals, as well as virtually all acid gases in the flue gas.

Emission performance is of key importance, but system cost and reliability are also essential for commercial viability. The design features an advanced integrated solids separator system instead of traditional cyclones. The solid separators are integrated into the traditional furnace structure, resulting in both improved reliability and lower system cost. This design allows a reduced combustor size, and elimination of the traditional hot expansion joints, while achieving improved operational performance and reduced maintenance costs. The demonstration of all of these integrated design features in a single unit, on a commercial scale, is the goal of this DOE Clean Coal Power Initiative Demonstration project, which CSU is hosting.

In addition to standard Powder River Basin coal, this unit will be able to burn low-grade waste coal, petroleum coke, and biomass fuels. Consuming any of these fuels represents both environmental and economic benefits to the community. About 20-30 million tons of coal washings from the steel industry in Pueblo, Co., has been an unsolvable environmental issue-- this project offers a solution . Recent forest fires have driven the local forestry service to endorse the continued removal of forest deadwood as a forest fire management strategy--this project offers a long-term, safe solution to wildfire management. In addition, the plant will be designed as a zero discharge plant, totally recycling all of its wastewater effluent streams.

PUBLIC ABSTRACT

Applicant (primary) name: Harrison R. Cooper Systems, Inc.

Applicant's address: 106 West Second North, Bountiful, Utah 84010

Team Members:

Eimco Process Equipment Co., Inc. – Salt Lake City, Utah
Consol Energy, Inc. – Pittsburgh, Pennsylvania
Kennecott Energy, Inc. – Gillette, Wyoming
Colorado Springs Municipal Power Authority – Colorado Springs, Colorado
University of Alaska College of Mines – Fairbanks, Alaska
University of Utah College of Mines – Salt Lake City, Utah

Proposal Title: Improved Boiler Performance through On-Line Coal Analysis

Commercial Application: New Facilities and Existing Facilities

Technology Type: Measure coal quality by nuclear magnetic resonance

Estimated total cost of project: (May not represent final negotiated costs.)

Total Estimated Cost: $ 372,298

Estimated DOE Share: $ 185,913

Estimated Private Share: $ 186,385

Anticipated Project Sites:

Colorado Springs, Colorado – Martin Drake Power Station
Fairbanks, Alaska – University of Alaska Coal-Fired Pilot Power Plant

Type of coal to be used: typically western coal but not uniformly sourced by design.

Size or scale of project: 100 to 500 tons per day coal input to boiler of power generator

Duration of proposed project: From date of award 12 months

PRIMARY CONTACT: For additional information, interested parties should contact:

Name: Harrison R. Cooper, president

Company: Harrison R. Cooper Systems, Inc.
106 West Second North
Bountiful, Utah 84010

Telephone Number: (801) 295-2345

E-mail: hcooper@hrcsystems.com

ALTERNATIVE CONTACT:

Name: Michael G. Nelson, associate professor

Institution: University of Utah.
College of Mines
Salt Lake City, Utah 84115

Telephone Number: (801) 585-3064

E-mail: mgnelson@mines.utah.edu

Brief description of project:

Efficiency in power production through converting combustion heat to steam for electrical generation, is subject to variability of coal quality charged to combustion. Losses in efficiency through coal variability may be in range of two to three percent of theoretical maximum efficiency of a coal combustion system. By monitoring coal quality in real time, combustion controls can be more exactly managed to narrow the gap between actual performance and theoretical performance.

A magnetic resonance instrument has been developed for on-line analysis of coal, allowing measurement of the combustion heat yield in real time. When this instrument provides coal-quality data to an advanced control system, incorporating expert systems, fuzzy logic, neural networks, and genetic algorithms, it will be possible to markedly improve the efficiency of the boiler, and also limit the emission of undesirable gases.

On-line coal analysis will also make it possible to blend coals from various sources, providing potential reductions in fuel costs while maintaining combustion efficiency and meeting emission requirements.

PUBLIC ABSTRACT

Applicant (primary) name: Xiong Cheng-Rui

Applicant=s address: Wu Si Dong Lu # 110 2-2-303 Bao Ding He Bei 071000 P.R.China
Street City State Zipcode

Team Members (if any):
(listing represents only participants
at time of application, not necessarily
final team membership)

Name City State Zipcode
Name City State Zipcode
(Use continuation sheet if needed.)

Proposal Title: An Igniting and Self-Stabilized pulverized-coal Burner

Commercial Application: New Facilities Existing Facilities
Other, Specify:

Technology Type:

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 192,000

Estimated DOE Share: $ 192,000

Estimated Private Share: $ 0.00

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s):

Location (city, county, etc.) State Zipcode
Location (city, county, etc.) State Zipcode
Location (city, county, etc.) State Zipcode

Type of coal to be used: bituminous

Primary Alternate (if any)

Size or scale of project: 3.0 tons/test 2 times/week

Tons of coal/day input

And/or

Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project:

(From date of award) 72 (Months)

PRIMARY CONTACT:
For additional information,
interested parties should contact:

Name

Position

( )
Telephone Number

Company

e-mail address Address

City State Zipcode

Alternative Contact:

Name

Position

( )
Telephone Number

Company

e-mail address

Address

PUBLIC ABSTRACT (cont=d)

An Igniting and Self-Stabilized Pulverized Coal Burner

By Xiong Cheng- Rui

In coal fired power plant, when boiler starts up, as the pulverized coal-air flow is not as easy to be ignited as gas or oil, and as the temperature in furnace is very low, gas or oil must be used for heating the furnace during start-up. In addition, when boilers operate under low load, the furnace temperature decreases so that stable combustion can not be kept. Gas or oil is also used to stabilize the combustion in the furnace. As the power demand varies in cycle within 24 hours in a day and in a week, a number of boilers must shut down in midnight or weekend and start up again in the morning or Monday morning or operate under low load during that period. This is called cycling. Thus a large quantity of gas or oil is expended on cycling.

To save the gas or oil, expended in cycling. This proposer [1] ,applied karlov,itz's flame theory [2] [3] to pulverized coal worked out a burner, which can ignite pulverized coal-air flow and stabilize its flame by using simple electric heating with small amount of energy consumption and without any assistance of gas or oil,. a "Proof-of-Concept-Test" was successfully completed. In a power plant with full scale, the expected functions were obtained [4][5][6]. However, it needs a further commercialization test to make the burner applicable for boiler practice. It will save at least 3.77 million tons oil (only from utility in U.S.) a year which can supply space heating to 4.6 million families.

More important significance of the burner lies in that it can also avoid flame failure, burn low grade coal including anthracite and coke on existing and new pulverized coal-fired boilers, and control NO_x and SO_2 emissions.

To get the four functions we do not need four research program of four times test work to be done. As long as the first function (saving oil) is obtained the other three functions can be obtained simultaneously. Of course optimization is needed to get an all-round balanced four functions.

To complete the application test, the main research work is a practical one. It can be performed in a vintage boiler first, a $ 0.192 million investment can get $ 6.6 million commercial benefit very easily from deploying the research result to existent 20-55 MW coal-fired units in U.S. utility and totally $ 361.5 million from the 20-600 MW units.

Till now, only that boiler with Fluidized—Bed Combustor (FBC) can burn LGC and control NO_x/SO_2 simultaneously well. However these FBC have not formed a large scale for electric power generation, and research on FBC has expended a large amount of funds in the past two decades.

The proposed work is a simpler and better and cheaper way of burning LGC and controlling, NO_x/SO_2 emission simultaneously than FBC.

As this burner has a high and unique flame stability. It will be helpful to develop other advanced combustion technology, for example, the limestone injection into furnace for capturing SO_2 and getting a chemical product calcium sulfate.

As this burner is for pulverized coal use, and pulverized coal is and will be the main fuel for power generation and will be used continuously in DOE's "Combustion 2000", a coal—related R&D program, and according to available information there has been no such a pulverized –coal burner which has such an excellent multi-function as the proposed burner has. So this burner will have a long viability in commercial applications.

Saving oil (low cost), enhancing reliability, burning low grade coal(low cost).and improving NO_x/SO_2 control, all these meet closely the DE—PS26—02NT41428—Solicitation the Clean Coal Power Initiative.

PUBLIC ABSTRACT

Applicant (primary) name: Clean Energy Systems, Inc. (CES)
Applicant's address: 8801 Folsom Blvd., Suite 275 Sacramento CA 95826
Street City State Zipcode

Team Members (if any): Agreements to be signed during Project Definition Phase
(listing represents only participants Name City State Zipcode
at time of application, not necessarily
final team membership)
Name C ity State Zipcode
Name City State Zipcode
(Use continuation sheet if needed.)

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1. Proposal Title: A 20 MW ZERO EMISSION COAL-FIRED DEMONSTRATION POWER PLANT
Commercial Application:X New Facilities X Existing Facilities
Other, Specify:
Technology Type: Gasification and Combustion with Full Carbon Capture
Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 109,860,000

Estimated DOE Share: $ 54,930,000

Estimated Private Share: $ 54,930,000

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s): To be determined. Possible sites identified in North Dakota, Oklahoma, Mississipi, Utah, and California
Location (city, county, etc.) State Zipcode

Type of coal to be used: Dependent upon final site location. Proposal assumes Illinois No. 6, but other coals, including lignite, may be used. Renewable fuel co-firing is also anticipated.

Size or scale of project: 214 short tons/day coal input
Tons of coal/day input

And/or
20 MW net electrical output
Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 120
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, interested parties should contact:

Name Keith Pronske
Position Vice President, Business Development
(916) 379-9143
Telephone Number
Clean Energy Systems, Inc.
Company
klpronske@cleanenergysytems.com
e-mail address
8801 Folsom Blvd, Ste. 275
Address
Sacramento CA 95826
City State Zipcode

Alternative Contact:

Name Fermin (Vic) Viteri
Position Chief Technical Officer
(916) 379-9143
Telephone Number
Company Clean Energy Systems, Inc.
fviteri@cleanenergysystems.com
e-mail address Address
8801 Folsom Blvd, Ste. 275
Sacramento CA 95826

PUBLIC ABSTRACT (cont'd)

Brief description of project:

Clean Energy Systems, Inc., (CES) has developed a fossil- fueled, zero atmospheric-emission power plant concept that can use gasified coal to produce power without pollution. The California Energy Commission co- funded a proof-of-principle demonstration of a scaled model of the enabling gas generator (110Kw_t) and the federal Department of Energy's National Energy Technology Laboratory (DOE/NETL) is co-funding the design, fabrication and testing of a 10 Mw_e prototype gas generator. Fabrication is complete and this gas generator will be tested in August and September of 2002. The California Energy Commission has also co-funded a 500 kw_e natural gas- fired demonstration plant that is currently under construction and scheduled for operation in early 2003. Air Liquide and Mirant Corporation are also project participants.

The goal of this project is to construct a small (20 Mw_e) power plant to demonstrate the CES technology for zero atmospheric-emission power plants using a coal syngas, either alone or co-fired with renewable fuels. Long-term reliability and durability testing will be conducted over a seven- year operating period.

This plant would also demonstrate several critical enabling technologies that will help ensure long-term clean, reliable and affordable electricity. In addition to the CES zero-emission power generation technology, the plant will use advanced steam turbines under development by Elliott Turbomachinery Co., Inc. that are expected to operate at steam conditions of 1500 ^{o} F and 1200 psia (high pressure turbine) and 2200 ^{o} F and 170 psia (reheat turbine). Further, this plant would demonstrate a gasification technology developed by Westinghouse Plasma Corporation that is currently in use in several waste-to-energy plants. These three technology advancements facilitate new commercial opportunities for zero-emission coal plants, ranging in size from 50 MW to 400 MW.

A specific site has not been selected, although several potential sites have been identified, including locations in North Dakota, Oklahoma, Mississippi, and California. A final site will be selected during the Project Definition Phase in 2003.

The CES system burns a clean hydrocarbon fuel, such as a syngas from coal or biomass, with oxygen to produce a working gas consisting substantially of steam and carbon dioxide. The working fluid is fed into one or more steam turbines, which drive electric generators to create power. The drive gas is taken from the turbine(s) to a condenser/separator, where the steam is cooled to water and the carbon dioxide is separated as a gas. The water is returned to the gas generator to cool the unit and produce more steam. The CES system offers the potential, when burning natural gas or gasified coal, for higher net efficiencies than combined cycle power plants with the added advantage of zero air emissions. But to achieve these higher efficiencies, more advanced steam turbines are required, capable of operating at higher temperatures than today's

turbines. The turbines under development and proposed for this project are an important step forward. With existing steam turbines, however, CES technology still remains feasible and commercially competitive with other forms of clean or renewable energy.

This project will consist of four primary phases: Project Definition Phase, Design Phase, Construction Phase, and Demonstration Phase. Activities to take place during the Project Definition Phase are discussed in the proposal, but the highest priority will be placed on selecting the optimal plant site that takes into account existing coal plant infrastructure and the ability to beneficially use the captured CO_2 for Enhanced Oil or Coal Bed Methane Recovery.

The overall goal of this project is to demonstrate the durability and reliability of a zero-emission coal-fired power plant using CES technology. The anticipated cost of this project is $109,860,000, consisting of $2,433,000 during the Project Definition Phase, $73,711,000 during the Design and Construction Phases, and $33,716,000 during the demonstration phase. The DOE/NETL funding requested is $54,930,000, of which $1,217,000 is required for the Project Definition Phase. The remaining funds would be required in the event all identified milestones in the Statement of Work are achieved during the Project Definition Phase. Matching funds or in-kind contributions will be provided by CES and other partners to be selected during the Project Definition Phase.

A successful project will provide over 50,000 hours of operating experience on the gas generator and related components, demonstrating the durability and reliability of the gas generator, the advanced steam turbines, and Westinghouse's plasma gasification system. Commercial implementation of this technology can eventually lead to net plant efficiencies in excess of 60%, with zero emissions when burning natural gas, and efficiencies of 44% with zero emissions when burning coal.

PUBLIC ABSTRACT

Applicant (primary) name: AmerenUE

Applicant=s address: 1901 Chouteau Avenue, St. Louis, MO 63103
Street City State Zipcode

Team Members (if any): Powerspan, New Durham, NH 03855
(listing represents only participants at time of application, not necessarily final team membership)
Name City State Zipcode

Sargent & Lundy, Chicago, IL 60603
Name City State Zipcode

The Andersons, Maumee, OH 43537
Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Demonstration of the Electro-Catalytic Oxidation (ECO) Emissions Control Technology on a 510 MWg Power Plant Firing Powder River Basin Fuels

Commercial Application: **9** New Facilities XX Existing Facilities

9 Other, Specify: _____

Technology Type: Air Emissions Reduction

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 146,060,000

Estimated DOE Share: $ 73,030,000

Estimated Private Share: $ 73,030,000

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): West Alton, St. Charles County, MO 63386
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Powder River Basin (Primary) Illinois bituminous (Alternate (if any))

Size or scale of project: _____
Tons of coal/day input
And/or
510 MW gross (Megawatts, Barrels per day, etc.)
Other (if necessary)

Duration of proposed project: 53
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Name: Susan L. Gallagher

Position: General Manager – Corporate Communications

Telephone Number: (314) 554-2175

Company: Ameren

e-mail address: SGallagher@amren.com

Address: P.O. Box 66149, Mail Code 100

City State Zipcode: St. Louis, MO 63166-6149

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Demonstration of the Electro-Catalytic Oxidation (ECO) Emissions Control Technology on a 510 MWg Power Plant Firing Powder River Basin (PRB) Fuels

Abstract

AmerenUE (St. Louis, MO) and Powerspan Corp. (New Durham, NH) will demonstrate--at full commercial scale--Powerspan's advanced proprietary multi-pollutant control technology – Electro-Catalytic Oxidation (ECOTM). The demonstration will be conducted on a coal-fired power plant burning primarily Powder River Basin (PRB) coal. In a single system, ECO technology removes greater than 98% of sulfur dioxide (SO2), 90% of nitrogen oxides (NOx), 80 to 90% of mercury, and over 95% of fine particulate matter (PM2.5) and air toxics from a coal-fired flue gas stream. The ECO system produces a commercially salable, ammonium sulfate nitrate fertilizer byproduct, reducing operating costs and avoiding landfill disposal of waste. ECO is more effective, more economical, and more environmentally attractive than the best available emission control technologies currently in use. Capital costs of commercial ECO systems are estimated to be approximately 40% lower than the cost of alternative solutions required to obtain comparable performance.

AmerenUE will install an ECO system on Unit-2 of Sioux Plant, a 510-MW unit in St. Charles County, Missouri, near St. Louis. The ECO system will treat all of the flue gas from Unit-2 and will include all supporting systems to produce, handle, and transport salable fertilizer. The fertilizer will be sold into the marketplace. An existing large, diversified agribusiness and retailing company will participate in design and operation of the fertilizer processing system to ensure the product meets market requirements. This project will demonstrate the technical performance of the ECO process on low-sulfur, sub-bituminous (PRB) coal and will demonstrate the overall economics of the system. This will be the first ECO unit installed to treat an entire flue gas stream, and the first unit to treat flue gas from predominantly PRB coal. It will be designed to the same standards for reliability, controllability, flexibility, and serviceability that would be used for any other permanently installed utility pollution control system. It will be exposed to plant startups and shutdowns, load variation, fuel variation, and boiler upsets. Consequently, the operating experience will be a direct measure of the technical and commercial readiness of ECO and will provide the operating experience needed to support accelerated and widespread commercial adoption of this technology.

In the first phase of this project, a 1.5 MW slipstream pilot will be installed and operated for approximately six months on Sioux Unit-2. This slipstream unit will contain all of the same processing units and in the same configuration as will be used in the full-scale unit. Successful operation of this pilot will be the basis for proceeding with the full-scale unit.

Powerspan’s ECO technology is a three-stage process consisting of a dielectric barrier discharge reactor; an ammonia scrubber/absorber column; and a conventional, vertically oriented wet electrostatic precipitator. The dielectric barrier discharge reactor oxidizes the pollutants. The scrubber removes the SO2 and the oxidized NOx. The wet electrostatic precipitator (WESP) removes any aerosols created from the reactor and from the scrubbing process. Additionally, the WESP removes fine particles and oxidized particulates, such as mercuric

oxide. The mercury removed from the flue gas will be isolated for disposal to avoid any impact on the usability of the byproducts. The ammonium sulfate and nitrate collected in the scrubber are crystallized to form ammonium sulfate nitrate fertilizer. The fertilizer product is in the same physical form and of the same chemical make-up as is currently used for fertilizer and will have a ready market both domestically and overseas. Since the ECO unit is installed after the existing dry electrostatic precipitator, the process has no effect on the existing re-use options for the plant's ash. Powerspan has demonstrated the pollutant removal capability of the ECO system in a 1-MW pilot, operating continuously on a slipstream from First Energy Corp's R.E. Burger Plant in Ohio. A 50-MW unit, also on a slipstream from the R.E. Burger Plant, is expected to be operational in early summer 2003. The Burger Plant burns primarily bituminous coal.

Expected Project Key events:
(1) January 2003 – Project award
(2) June 2003 – ECO Pilot installed on Sioux Unit 2
(3) September 2003 – Pilot data evaluated
(4) October 2003 – Detailed design of full-scale unit begins
(5) March 2006 – Startup of full-scale unit
(6) May 2006 – Full-scale unit put in full time service; 12 month long term performance testing period begins
(7) May 2007 – Project complete
The total duration of this project is four and one half years and the estimated cost is $146MM

PUBLIC ABSTRACT

Applicant (primary) name: EnviRes, LLC

Applicant's address: 1509 Bull Lea Boulevard, Suite 500
Lexington, KY 40511

Street City State Zipcode

Team Members (if any): None
(listing represents only participants at time of application, not necessarily final team membership)

Name City State Zipcode

Name City State Zipcode

Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Clean Coal Power Initiative

Commercial Application: XX New Facilities Existing Facilities

9 Other, Specify: _____

Technology Type: Gasification

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 72,826,451

Estimated DOE Share: $ 31,584,973

Estimated Private Share: $ 41,241,478

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): East St. Louis, IL 62201
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Illinois #6 (Primary) Illinois #5 (Alternate (if any))

Size or scale of project: 454 t/d
Tons of coal/day input
And/or
Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 54
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Donald P. Malone
Name

Principal Investigator
Position

(606) 474-6279
Telephone Number

EnviRes LLC
Company

dp.malone@verizon.net
e-mail address

685 Kresview Drive
Address

Grayson, KY 41143
City State Zipcode

Alternative Contact: William Renner
Name

Vice President, Finance
Position

(859) 254-8142
Telephone Number

EnviRes LLC
Company

rennerwilliam@aol.com
e-mail address

1509 Bull Leaa Boulevard, Suite 500
Address

Lexington, KY 40511

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Most major energy studies have concluded that integrated gasification combined cycle (IGCC) technology uniquely offers the prospect of meeting increasingly stringent environmental regulations and increasing energy efficiency requirements for the production of electrical power from domestic coal reserves. HyMelt technology, described in this proposal, is a radically new approach to coal gasification that offers even greater benefits than conventional IGCC at lower cost. We propose building a gasification plant that uses 454 t/d of Illinois #6 coal as feed in East St. Louis, IL. The plant size is the minimum size that allows a positive cash flow for the project while minimizing the capital at risk. The total cost for this project is approximately $68,241,000. Approximately $29,345,000 of the total funding comes from DOE. We present a schedule that obligates us to repay all of the money provided by DOE from operating revenues of the project.

HyMelt technology, in contrast to conventional gasification technology, produces separate hydrogen rich and carbon rich streams from coal or virtually any other carbonaceous fuel. Sulfur in the feed converts exclusively to H2S making its removal less costly. The HyMelt technology can generates valuable gaseous products at pressures of 75 to 450 psig, reducing or eliminating the cost of compression for downstream use. The carbon monoxide rich stream can be used as fuel for a combustion turbine in a combined cycle generating system with a thermal efficiency slightly higher than that for natural gas and with an emission profile similar to that of natural gas.

The fuel gas produced by this project will be used in fired heaters of nearby customers. This saves millions of dollars in project costs by not having a combustion turbine, a generator, a steam turbine, a generator and a transformer in the project. Computer simulation of combustion turbine performance and validation with pilot combustion testing, which will be done outside this project, will complete address issues relating to combustion turbine performance. Combustion turbine, combined cycle power generation could be added later as a separate project. Sulfur oxide and nitrogen oxide emissions from HyMelt produced flue gas are lower than for any other coal gasification technology. The capture of mercury and other volatile metals often found in coal is orders of magnitude cheaper than for mercury removal in conventional pulverized coal power generation and several times cheaper than for other gasification processes. HyMelt technology offers a lower cost route to CO2 sequestration than other gasification processes.

In addition to the above described benefits to electrical power generation, HyMelt technology offers a high volume, low cost route to chemical grade hydrogen. We believe that the quantity and cost of the hydrogen produced by HyMelt will accelerate the use of fuel cells for both stationary power generation and for powering personal transportation vehicles. Similarly, the low cost availability of hydrogen will allow refiners to more economically reduce sulfur and other pollution forming precursors in petroleum products. HyMelt technology offers the potential to produce ammonia, methanol and acetic acid more cheaply than from natural gas. This could mean the difference between domestic vs. offshore production of these chemicals. HyMelt technology offers the prospect of substantially reducing the demand for increasingly expensive natural gas in every area of its use except for residential heating. We believe that HyMelt technology can make the vast reserves of high sulfur coal in states such as Illinois a tremendous economic asset.

PUBLIC ABSTRACT

Applicant (primary) name: **Wisconsin Electric Power Company**

Applicant's address: **333 W. Everett St., Milwaukee, WI 53203**

Team Members **ADA-ES**
Cummins & Barnard
Environmental Elements Corp.
EPRI

Proposal Title: **"TOXECON Retrofit for Mercury and Multi-Pollutant Control on Three 90 MW Coal-Fired Boilers"**

Commercial Application: ☐ New Facilities ☒ Existing Facilities

Technology Type: **Fossil Energy R&D, Air Pollution Control from Coal-Fired Power Plants**

Total Estimated Cost: **$49,536,624**

Estimated DOE Share: **$24,768,312**

Estimated Private Share: **$24,768,312**

Anticipated Project Sites: **Wisconsin Electric Power Company**
Presque Isle Power Plant
2701 N. Lakeshore Blvd.
Marquette, MI 49855-2017

Type of coal to be used: **Powder River Basin**

Size or scale of project: **270 MW Total (Unit 7 = 90 MW, Unit 8 = 90 MW, Unit 9 = 90 MW net)**

Duration of proposed project: **60 months**

PRIMARY CONTACT:
For additional information,
Interested parties should contact:

Richard Johnson
Principal Engineer Air Quality
Wisconsin Electric Power Company
333 W. Everett St.
Milwaukee, WI 53203
(414) 221-4234
dick.johnson@we-energies.com

Alternative Contact:

Jean Bustard
Executive Vice President
ADA Environmental Solutions, LLC
8100 SouthPark Way, B-2
Littleton, CO 80120
(303) 734-1727
jeanb@adaes.com

Brief description of project:

In December 2000 EPA announced their intent to regulate mercury emissions from the nations coal-fired power plants. Draft legislation indicates that new regulations may require removal efficiencies as low as 50% or as high as 90% from existing sources. The most mature retrofit technology available today for meeting 90% mercury control of all species of mercury is injecting powdered activated carbon (PAC) before a fabric filter. It is also highly desirable that coal utilization byproducts (CUBs) are beneficially used, thereby reducing waste products. TOXECON is an EPRI patented process where sorbents for mercury and other air toxic emissions control are injected into a pulse-jet baghouse that is installed downstream of the existing particulate control device. The TOXECON configuration allows for separate treatment or disposal of the ash collected in the primary particulate control device.

We Energies proposes to design, install, evaluate and operate TOXECON as an integrated emissions control system for mercury and particulate matter from three 90 MW units at the Presque Isle Power Plant located in Marquette, Michigan. . The proposed project will also investigate the capabilities of the proposed system for SO_2 and NO_x control. The primary attribute of TOXECON is that it potentially represents the low-cost option for greater than 80% mercury control for coal-fired power plants, and may be the primary mercury control choice for western coals, and the only choice for units with hot-side electrostatic precipitators. The approach used in this program of using one baghouse structure for three small boilers further enhances the cost effectiveness by taking advantage of economies of scale. This approach is also applicable to a significant number of existing coal fired units in the U.S. Twenty-six percent (26%) of U.S. units are 100 MW or smaller, and 53% of the units are 200 MW or smaller. Using TOXECON as a trim technology for other primary pollutants, SO_2 and NO_x, further enhances its attractiveness for improved environmental control.

The overall objective of this project is to demonstrate TOXECON for air toxic control on at We Energies Presque Isle Power Plant coal-fired boilers Units 7, 8, and 9.

Specific objectives of the project are:

- Achieve at least 90% mercury removal;
- Increase collection efficiency of PM, especially during upset conditions;
- Determine viability of sodium injection for up to 70% SO_2 control;
- Determine capability of sodium injection for trim control of NOx;
- Recover at least 90% of mercury captured in the ash;
- Minimize waste disposal with a target of 100% utilization;
- Progress mercury CEMs into a reliable mercury measuring system; and
- Successfully integrate the entire system so that all subsystems are operating at peak performance.

The scope of work covers five Phases over a five year long period. Phase 1 will be completed in the first quarter of 2003. Phase 2 covers a 15-month time period and involves final design and engineering assessment of the various subsystems. Phase 3 is devoted to installation and construction with start-up scheduled for fall 2004. Demonstration activities will occur

during the three-year Phase 4 period. System operation, performance, optimization, and integration functions will be evaluated. Phase 5 is reserved for reporting and project management functions.

As a result of the project, there will be a significant reduction in the rate of air emissions from Presque Isle Units 7, 8 and 9 and progress will be made to establish the design criteria for one of the most promising mercury control retrofit technologies available today. The project will have a positive impact on the future of the station and will provide the power generating industry with important design and operating data on TOXECON. It is expected that the equipment installation phase of this project will be completed by fall of 2004.

PUBLIC ABSTRACT

Applicant (primary) name: Western Greenbrier Co-Generation , LLC

Applicant=s address: 125 Alta Mountain Road, Lewisburg, WV 24901
Street City State Zipcode

Team Members (if any): Parsons E&C, Reading, PA 19607
(listing represents only participants at time of application, not necessarily final team membership)
Name City State Zipcode

Alstom Power, Inc., Windsor, CT 06095
Name City State Zipcode

Hazen Research, Inc., Golden, CO 80403
Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Western Greenbrier Co-Production Demonstration Project

Commercial Application: XX New Facilities **9** Existing Facilities

9 Other, Specify: _____

Technology Type: Clean Coal Co-Production Power Plant

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 215,000,000

Estimated DOE Share: $ 107,500,000

Estimated Private Share: $ 107,500,000

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Rainelle, Greenbrier County, WV 25962
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Bituminous waste
Primary Alternate (if any)

Size or scale of project: 1,600 tons per day
Tons of coal/day input
And/or
75 MW Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 60
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, interested parties should contact: Name: Wayne D. Brown

Position: Engineering and Operations Manager

Telephone Number: (304) 645-5419

Company: Western Greenbrier Co-Generation, LLC

e-mail address: wayne@area125.com

Address: 125 Alta Mountain Road

City State Zipcode: Lewisburg, WV 24901

Alternative Contact:

Name

Position

Telephone Number: ( )

Company

e-mail address

Address

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Western Greenbrier Co-Generation, LLC (WGC) proposes to construct a 75 MW clean-coal, co-production demonstration project in Rainelle, West Virginia. The primary fuel will be waste coal from a 4 million ton refuse site in Anjean, West Virginia. Parsons E&C (Reading, Pennsylvania) will be the turn-key systems contractor with Alstom Power (Windsor, Connecticut) providing an advanced fluidized-bed boiler system. The integrated co-production facility will manufacture structural bricks certified to meet insulation and load-bearing specification requirements while simultaneously providing 75 MW of power to the national grid. Ash chemical properties will be tightly controlled using a process developed by Hazen Research Labs in Golden, Colorado. The patented structural bricks, which contain both ash and wood waste (trademarked "WoodBriks™."), were developed by Midway Environmental Associates of Arvada, Colorado.

The power plant will be the "anchor tenant" in a new, environmentally balanced industrial park (an ECO-Park), which builds on a synergistic relationship to the clean-coal power generation system. The ECO-Park will include greenhouse structures for hot water utilization, the WoodBrik™. co-production facility for ash utilization, and a variety of steam users including a hardwood dry kiln.

Western Greenbrier Co-Generation, LLC is a new public service entity formed to serve the interests of three municipalities (Rainelle, Rupert, and Quinwood) in Greenbrier County, West Virginia.

PUBLIC ABSTRACT

Applicant (primary) name: Universal Aggregates, LLC

Applicant=s address: 300 Bursa Drive, Suite 303, Bridgeville, PA 15017
Street City State Zipcode

Team Members (if any): CONSOL Energy, PJ Dick, and SynAggs, LLC
(listing represents only participants at time of application, not necessarily final team membership)

(Use continuation sheet if needed.)

Proposal Title: Commercial Demonstration of the Manufactured Aggregates Technology Utilizing Wet FGD Coal Combustion Byproducts

Commercial Application: X New Facilities **9** Existing Facilities

9 Other, Specify: _____

Technology Type: Manufactured Aggregate Technology

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 25,700,000

Estimated DOE Share: $ 10,300,000

Estimated Private Share: $ 15,400,000

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): City of Lakeland Unit #3, Lakeland, FL
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: _____ _____
Primary Alternate (if any)

Size or scale of project: 239,500 TP year coal combustion byproducts
Tons of coal/day input
And/or
_____ Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 33
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, Roy O. Scandrol
interested parties should contact: Name

Position

(412) 914-1143
Telephone Number

Universal Aggregates
Company

Royscandrol@universalaggregates.com
e-mail address

As above
Address

City State Zipcode

Alternative Contact:

Name

Position

( )
Telephone Number

Company

e-mail address

Address

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Universal Aggregates, LLC proposes to design, construct and operate a lightweight aggregate manufacturing plant at the City of Lakeland, Lakeland Electric (L.E.) McIntosh Unit #3 Power Station in Lakeland, Polk County, Florida. The installation and start-up expenses for the Lakeland manufactured aggregate facility are $25.7 million. The DOE share is $10.3 million (40%) and the Universal Aggregates share is $15.4 million (60%). The project team consists of CONSOL Energy Inc, P.J. Dick, Inc., SynAggs, LLC, and Universal Aggregates, LLC. The Lakeland facility will transform 239,500 tons per year of coal combustion byproducts that are currently being disposed of in an on-site landfill into 388,000 tons of a useful product, lightweight aggregates that can be used to manufacture lightweight masonry blocks or lightweight concrete.

The 239,500 tons per year of coal combustion byproducts is divided into 157,000 tons per year wet FGD filter cake, 75,000 tons per year fly ash and 7,500 tons per year of bottom ash. In addition approximately 100,000 tons per year of dry FGD materials will be imported into the Universal Aggregates, LLC plant and processed with the Lakeland coal combustion byproducts.

In addition to the environmental benefits, the Lakeland facility will create 15 manufacturing jobs plus additional employment in the local trucking industry to deliver the aggregates to customers or reagents to the facility. A successful demonstration would lead to additional lightweight aggregate manufacturing facilities in the United States. There are currently about 180 wet lime/limestone systems operating in the United States that produce an adequate amount of wet coal combustion byproduct to economically justify the installation of a lightweight aggregate manufacturing facility.

Industry sources believe that as additional scrubbing is required, wet FGD technologies will be the technology of choice. Letters from potential lightweight aggregate customers indicate that there is a market for the product once the commercialization barriers are eliminated by this demonstration project.

PUBLIC ABSTRACT

Applicant (primary) name: University of Kentucky Research Foundation

Applicant=s address: 201 Kinkead Hall, Lexington, KY 40506
Street City State Zipcode

Team Members (if any): LG&E Energy Corporation, Louisville, KY 40232
(listing represents only participants at time of application, not necessarily final team membership)
Name City State Zipcode

University of Kentucky Center for Applied Energy Research, Lexington, KY 40511
Name City State Zipcode

Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Advanced Multi-Product Coal Utilization By-Product Processing Plant

Commercial Application: XX New Facilities **9** Existing Facilities

9 Other, Specify:

Technology Type: Hydraulic classification froth flotation technology to produce advanced high value materials from coal utilization by-products

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 8,916,739

Estimated DOE Share: $ 4,450,163

Estimated Private Share: $ 4,466,576

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Ghent Power Station, Ghent, KY 41045
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Pittsburgh coal
Primary

Alternate (if any)

Size or scale of project: 800 tons per day of coal ash input
Tons of coal/day input

And/or

Megawatts, Barrels per day, etc.

Other (if necessary)

Duration of proposed project: 48
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Name: Dr. Thomas L. Robl

Position: Associate Director

Telephone Number: (859) 257-0272

Company: University of Kentucky Center of Applied Energy Research

e-mail address: robl@caer.uky.edu

Address: 2540 Research Park Drive

City State Zipcode: Lexington, KY 40511

Alternative Contact: Mr. Kenneth Tapp
Name

Position

Telephone Number: (502) 627-3154

Company: LG&E Energy Corporation

e-mail address: kenny.tapp@lgeenergy.com

Address: 220 West Main Street, P.O. Box 32010

Louisville, KY 40232

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

The installation of an advanced coal ash beneficiation processing plant is proposed by LG&E Energy, Corp at the 2,200 MW Ghent Power Plant in Ghent, Kentucky. The Ghent Power plant is owned by Kentucky Utilities Company, a regulated subsidiary of LG&E Energy, Corporation. The demonstration plant will be a near commercial scale installation and will produce:

- 156,000 tons per year of pozzolan which substantially exceeds ASTM C-618 criteria for loss on ignition (LOI), fineness and strength index.
- 16,000 tons per year of ASTM C-330 and C-331 compliant high grade lightweight aggregate.
- 16,000 tons per year graded fill sand.
- 1,500 tons per year of high quality polymeric filler.
- 8,000 tons of recycled carbon fuel.

The proposed plant represents the next step in coal utilization by-product (CUB) beneficiation, addressing the entire CUB stream and a wide array of quality issues. The process generates a pozzolan that can be used at higher portland cement substitution levels in concrete (i.e. 30% versus the current 20%), while producing better strength and performance than what is available from unprocessed ash.

Coarse ash is beneficiated to produce either lightweight aggregate, suitable for use in concrete masonry units such as blocks, or graded fill sand for construction applications while unburned carbon is concentrated for re-use as a supplemental fuel. The process also produces a clean, very fine-size material (~3 to 4 µm median particle size) suitable for use as a polymer filler or specialized pozzolan. With this suite of highquality, consistent products, the potential for total CUB utilization can be realized.

The manufacture of portland cement is one of the highest generators of CO_2 of any industrial process, releasing approximately 1 ton of CO_2 per ton of cement produced. The 156,000 tons of high quality pozzolan will displace an equivalent amount of portland cement, representing a direct and significant green house gas offset.

The process is based upon a hydraulic classification and froth flotation technology developed at The University of Kentucky CAER over the past decade. The technology, which incorporates several patents, can process both ash stored in existing disposal ponds and/or directly from the plant. Raw feed is classified by size into a pozzolan stream (-200 mesh) and a coarse stream (+200 mesh). These coarse materials are further classified and concentrated into a block sand product and coarse carbon product by spiral concentrators. The fine pozzolan stream is treated with a patented reagent system and the fine carbon is removed via froth flotation. The pozzolan stream is then concentrated, filtered and dried. A small stream from the froth cell is further processed hydraulically to produce a material with a finer particle size. This material is suitable for use in a number of applications including a polymer additive.

PUBLIC ABSTRACT

Applicant (primary) name: Tampa Electric Company

Applicant=s address: 702 North Franklin Street , Tampa, FL 33602
Street City State Zipcode

Team Members (if any): Mitsui Babcock
(listing represents only participants at time of application, not necessarily final team membership)
Name City State Zipcode

BOC
Name City State Zipcode

Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: NOX Removal and Reduction Project for Coal-Fired Power Plants

Commercial Application: **9** New Facilities XX Existing Facilities

9 Other, Specify: _____

Technology Type: Mitsui Babcock Selective Autocatalytic Reduction and BOC LoTOx

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 94,877,698

Estimated DOE Share: $ 37,951,079

Estimated Private Share: $ 56,926,619

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s) Tampa Electric Polk Station, Apollo Beach, FL
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: _____ _____
Primary Alternate (if any)

Size or scale of project:

Tons of coal/day input

And/or

_____ Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 36
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, Robert N. Howell
interested parties should contact: Name

Manager Project Controls
Position

(813) 228-1932
Telephone Number

Tampa Electric Compans
Company

rnhowell@tecoenergy.com
e-mail address

As Above
Address

City State Zipcode

Alternative Contact:

Name

Position

( )
Telephone Number

Company

e-mail address

Address

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Cost effective generation of electricity is vital to the economic growth and stability of this nation. To accomplish this goal a balanced portfolio of fuel sources must be maintained and established which not only addresses the cost conversion of these energy sources to electricity, but also does so in an efficient and environmentally sound manner.

Conversion of coal as an energy source to produce steam for a variety of systems has been a cornerstone of modern industry and is projected to be for future years. However, the use of coal in combustion systems has traditionally produced unacceptable levels of gaseous and particulate emissions, albeit that recent combustion, removal, and mitigation techniques have drastically reduced these levels.

Acid rain and increased formation of ground level ozone have been associated with excessively high levels of nitrogen oxides, (NOx) being released into the atmosphere. The Clean Air Act of 1990, and the current Clear Skies initiative instituted several proactive requirements aimed at the electric generation industry to significantly reduce gaseous emissions, and in particular NOx and mercury emissions. As regulated emissions for NOx continue to become increasing stringent in an effort to obtain ultra low levels, the options available to this industry have not kept pace and currently remain limited. The vast majority of NOx reduction technologies involve combustion modifications, through the use of burners, advanced air staging systems, fuel switch, neural networks, and co-firing techniques. There are currently a few electric power generating facilities which have obtained NOx emissions in the 0.10-0.15 lbs/MMBtu range, but these are the exception to the rule. These units are of a specific design which allow for deep combustion staging and fire specific fuel supplies.

Unfortunately, there exist many coal-fired facilities which must rely upon other technologies in conjunction with combustion modifications to meet new regulated limits. Selective Catalytic Reduction, (SCR) has traditionally been the only proven and reliable means to obtain low NOx emission levels. This technology involves the injection of ammonia downstream of the combustion zone and the use of a catalyst bed which is located immediately at the boiler outlet and ahead of the air preheater to remove NOx. Whereas, the technology appears straightforward it requires substantial effort and cost to install and operate. One such problem that is often encountered is the need to install either upgraded or new induced draft fans to overcome the increase in pressure drop due to the catalyst bed. In addition, large quantities of ammonia are required for this process and ammonia slips of 2-5 ppm are not uncommon.

Due to Tampa Electric's desire to obtain NOx emission levels of 0.10 lbs/MMBtu or less and to avoid the inherent problems associated with SCR installations and it's operation, Tampa Electric investigated various technologies to achieve ultra low levels of NOx emissions. The two technologies, which could provide significant benefit through their synergistic use, involve the Mitsui Babcock Selective Autocatalytic Reduction, (SACR) technology, and the BOC LoTOx system. The SACR process involves the injection of ammonia and natural gas in specific regions of the boiler for initial NOx reductions. Furthermore, it can be designed, installed and operational much faster than SCR's and don't require extensive modifications to the boiler. The LoTOx system will inject ozone at the inlet of the existing FGD to remove the balance of the requisite NOx from the flue gas stream and also aid in removal of mercury. The process includes an air separation plant and ozone generators. The capital cost for this system may be 75% -85% of a SCR and its operational and maintenance cost less depending upon site specific considerations.

PUBLIC ABSTRACT

Applicant (primary) name: **Stolar Research Corporation**

Applicant's address: 848 Clayton Highway, Raton, NM 87740
Street City State Zipcode

Tentative
Team Members (if any): CONSOL Energy, Morgantown, WV 26505
(listing represents only participants at time of application, not necessarily final team membership)
Name City State Zipcode

San Juan Coal Company, Waterflow, NM 87421
Name City State Zipcode

Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: **Demonstration of Upstream Clean Coal Technology to Reduce Ash, Sulfur, and Heavy Metals in Run-of-Mine Coal**

Commercial Application: **9** New Facilities **X** Existing Facilities

9 Other, Specify: _____

Technology Type: Drillstring radar and radio imaging to locate geologic structure anomalies

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 2,398,581

Estimated DOE Share: $ 973,581

Estimated Private Share: $ 1,425,000

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): To be determined
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Not applicable
Primary Alternate (if any)

Size or scale of project: Not applicable
Tons of coal/day input

And/or

Commercial-scale demonstration of advanced drilling and imaging technology in an operating coal mine(s)

Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 24
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Name **Larry G. Stolarczyk, Sc.D.**

President and Chief Technology Officer
Position

(505) 445-3607
Telephone Number

Stolar Research Corporation
Company

Lgstolar@aol.com
e-mail address

848 Clayton Highway
Address

Raton **New Mexico** **87740**
City State Zipcode

Alternative Contact: To be determined
Name

Position

( )
Telephone Number

Company

e-mail address

Address

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Consistent with the objective of the Clean Coal Power Initiative (CCPI) to reduce emissions from coal-fired power plants, the proposed project will demonstrate how upstream clean coal technology can reduce ash, sulfur, and heavy metals in run-of-mine (ROM) coal as a means to achieve cleaner coal combustion processes. From a value chain point of view, reducing ash, sulfur, and heavy metals in ROM coal is significantly less expensive and of greater benefit to society than removing the equivalent ash, sulfur, and heavy metals during or after the combustion process. Secondarily, the technology to be demonstrated will improve the efficiency of coal mine methane (CMM) production, reduce wastewater production in coal bed methane (CBM) fields, and prevent the spoiling (sterilization) of coal reserves by conventional CBM production processes. Since cleaner coal extraction, as well as CMM and CBM production, depend upon coal-bed geology, the project proposed by Stolar Research Corporation will demonstrate advanced drilling and structural imaging ahead of mining technology in coal beds.

The advanced drilling technology involves the drilling of horizontal in-mine boreholes through the center of a coal seam with a measurements-while-drilling (MWD) drillstring radar (DSR) system. In order to accomplish MWD navigation through undulations in a coal bed, the DSR technology will be added to the drillstring just behind the downhole motor.

The DSR technology will permit coal seam thickness mapping along the borehole as the drilling process occurs. The seam height and roof and floor sedimentary rock type will also be determined from measurements made while drilling. In addition, coal quality will be determined by measuring the bulk coal dielectric constant, while measurement of the vector dielectric constant will allow determination of the heading of the face cleat. The dielectric constant information is needed to determine the distance to the coal interface with the boundary sedimentary rock.

Once the first horizontal borehole has been completed, a second parallel borehole will be completed at least 1,000 feet from the first. Novel plastic casing techniques will be developed as a means of inserting radio imaging method (RIM-IV) instrumentation in the horizontal boreholes within the coal bed. The insertion system will be used to maneuver the RIM-IV receiver along the borehole and acquire the data for 3-D tomographic processing. The resulting 3-D tomography of the coal seam will provide high-resolution images of geologic anomalies that can be avoided during mining. The value of this practice is supported by the experience at the American Electric Power (AEP) Meigs mines, for example, that have documented significant increases in ROM coal ash when mining through geologic disturbance zones.

By incorporating the knowledge of the coal seam that is obtainable by the combination of the DSR and RIM-IV technologies, advanced geologic mapping will improve ROM coal quality and reduce the surface environmental problems of mine wastes. Coal that is cut cleaner by employing the technologies to be demonstrated in the proposed project will be able to be combusted with reduced overall environmental impacts and at lower cost.

PUBLIC ABSTRACT

Applicant (primary) name: SRT Group Inc.

Applicant's address: 3250 Mary Street, Suite 407
Miami, FL 33133

Team Members Arizona Public Service Company
P.O. Box 355, Mail Station 4913
Fruitland, NM 87416

Harris Group Inc.
1000 Denny Way, Suite 800
Seattle, WA 98109

(Use continuation sheet if needed.)

Proposal Title: SRT/ISPRA Flue Gas Desulphurization Process

Commercial Application: Existing Facilities

Technology Type: Environmental

Estimated total cost of project:

Total Estimated Cost: $7,349,938

Estimated DOE Share: $3,674,969

Estimated Private Share: $3,674,969

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s):	Four Corners Power Plant Farmington, NM 87416	
Type of Coal to be Used:	Primary Alternate (if any)	
Size or Scale of Project:	Flue Gas Desulphurization for a 3-MW Coal Plant	
Duration of Proposed Project: (from date of award)	18 Months	

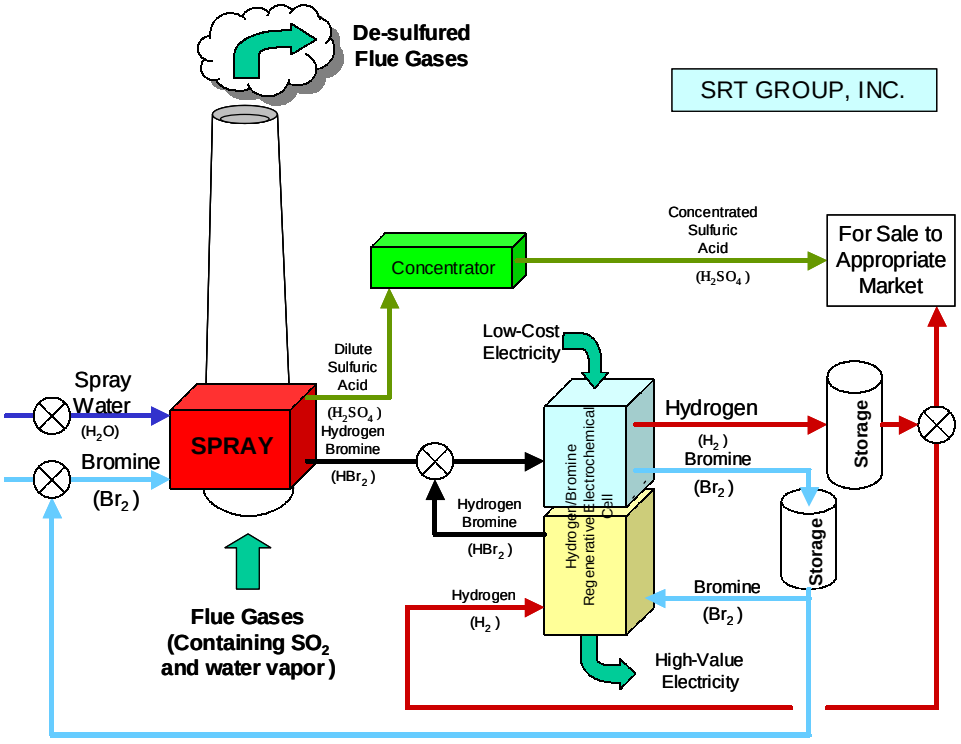
PRIMARY CONTACT: For additional information, interested parties should contact:	Name	Robin Parker
	Position	President
	Telephone Number	305-442-9966
	Company	SRT Group, Inc
	e-mail address	rzpst@compuserve.com
	Address	3250 Mary Street, Suite 407
	City	Miami, FL 33133

Alternative Contact:	Name	Lynn Montague
	Position	Project Manager
	Telephone Number	206-494-9544
	Company	Harris Group Inc.
	e-mail address lynn.montague@harrisgroup.com	
	Address	1000 Denny Way, Suite 8000
	City	Seattle, WA 98109

PUBLIC ABSTRACT (cont'd)

Brief description of project:

SRT Group, Inc., proposes partnering with the U.S. Department of Energy to test and commercialize a process for removing sulfur dioxide (SO_2) from the flue gas of coal-fired boilers. Wet scrubbing processes using lime and limestone as reagents are widely used as flue gas desulphurization (FGD) systems but have a major drawback in the expense of the reagent and large quantity of sludge produced. The SRT/ISPRA process offers an alternative wet scrubbing method by using a small amount of bromine (Br_2) as the reagent. In the process Br_2, SO_2, and water vapor (H_2O) react to produce sulfuric acid (H_2SO_4) and hydrogen bromide (HBr). The process has been demonstrated to remove more than 90% of the flue gas SO_2. It also has the added potential to aid in the reduction of nitrogen oxide (NOx) and mercury (Hg), which has been identified as goals of President Bush's Clear Skies Initiative.



SRT Flue Gas Process

A unique aspect of the SRT/ISPRA process is the regeneration of the reactant Br_2. In the electrolyzer, the HBr formed in the reactor is converted to Br_2 and H_2. Thus the reactant Br_2 is regenerated and a valuable fuel source H_2 is formed. The production of H_2 is in line with the current administrations support for developing hydrogen as a primary fuel for cars and trucks.

The process also has the ability to operate a H_2/Br_2 reversible cell. During on-peak hours the cell operates as a fuel cell by reacting H_2 with Br_2 to form HBr and power. To regenerate the chemicals, the cell operates as an electrolyzer, converting the HBr back to H_2 and Br_2.

The incorporation of the ISPRA FGD process with SRT's electrochemical HBr energy storage system enables a base-loaded, coal-fired plant to operate virtually SO_2 emission free, store off-peak energy, and produce marketable H_2 and H_2SO_4. The stored energy, in the form of H_2 and HBr, can be discharged during on-peak spikes and generation equipment outages, or for providing black start capability for peaking turbines.

The goal of the pilot trials is to demonstrate the SRT/ISPRA FGD process on a 3-MW scale. The trials will allow testing to determine the removal efficiency of SO_2, NOx, and Hg. Testing will also confirm the material and energy balance and allow for optimization of key operating parameters. Alternative methods to H_2SO_4 concentration, such as submersed combustion and evaporation, will be explored to determine if a more cost effective system can be found.

PUBLIC ABSTRACT

Applicant (primary) name: Silverado Green Fuel Inc.

Applicant's address: POBox 83730, Fairbanks, AK 99708
Street City State Zipcode

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

Great Northern Engineering, Anchorage, AK 99645
Name City State Zipcode

Energy Pacific Corp., Boise, ID 83706
Name City State Zipcode

Mineral Industry Res. Lab, Fairbanks, AK 99775
Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Clean Coal Power Generation with Low-Rank Coal-Water Fuel

Commercial Application: **9** New Facilities ■ Existing Facilities

9 Other, Specify: _____

Technology Type: Clean Coal Power Generation with Low-Rank Coal-Water Fuel

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 23,961,760

Estimated DOE Share: $ 9,718,366

Estimated Private Share: $ 14,243,394

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s): Fairbanks North Star Borough, AK 99709
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: AK Subbituminous Coal
Primary Alternate (if any)

Size or scale of project: 120 tpd
Tons of coal/day input
and/or
Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 48
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Name Edward J. Armstrong

Position President

Telephone Number (907)479-7014

Company Silverado Green Fuel Inc.

e-mail address armstrng@eagle.ptialaska.net

Address POBox 83730

City Fairbanks, State AK Zipcode 99708

Alternative Contact:

Name

Position

Telephone Number ( )

Company

e-mail address

Address

City State Zipcode

PUBLIC ABSTRACT (cont'd)

Brief description of project:

Clean Coal Power Generation from Low-Rank Coal-Water Fuel (LRCWF) Commercial Demonstration Project

The US has the largest share of the world's fossil energy reserves with over 25% of the proven coal reserves. US coal reserves are ample to fuel America's growth for centuries, whereas the combined gas and oil reserves can only provide a few decades of supply, at most. America's ascension to the most powerful and affluent society on Earth is due in large part to its abundance of domestic energy and low cost electrical power.

Decades of poor coal mining practices, dust generation during handling and shipping, large unsightly coal stockpiles, and coal burning and coke making without emission controls, have earned coal the title "dirty fuel." In spite of extensive mine land reclamation programs, tremendous advances in emission controls and the development of clean coal technologies, the public perception has changed little. Since low cost power produced from coal is the only choice we have for the foreseeable future, we must continue to develop ways to use coal in a more environmentally acceptable manner. This is the driving force for President Bush's Energy Policy Plan, the National Energy Technology Center's Vision 21 Program, and the DOE's Clean coal Power Initiative.

By contrast oil isn't viewed as a dirty fuel, despite the fact that if spilled it is hazardous and even toxic. Furthermore, the pressurized oil in thousands of miles of pipelines throughout the US is highly flammable and can even form explosive mixtures if a pipeline is ruptured either through a natural disaster or a terrorist act. So how can a fuel that is hazardous and can be highly toxic be regarded as a "clean" fuel? The answer is simple: **Oil is used sight unseen**. If coal could be used sight unseen in today's modern and tomorrow's advanced utilities, the environment would benefit and the public's perception of coal as a dirty fuel would begin to change.

Silverado's proposed Clean Coal Power from Low-Rank Coal-Water Fuel (LRCWF) Demonstration is designed to show the economic feasibility and environmental superiority of converting LRC into a liquid fuel that can be use efficiently in oil-fired generating systems (boilers, diesels and turbines), integrated gasification combined cycle power plants, and other advanced combustors operating at high pressures. LRCWF is not a new fuel, but a new fuel form. Burning or gasifying LRCWF is simply burning a beneficiated LRC. Thus LRCWF retains all the desirable LRC combustion characteristics needed for advanced power generating systems, while eliminating all of the utilization and environmental problems associated with bulk coal handling and use, and the hazards associated with oil spills and leaks. LRCWF is a liquid fuel and enjoys all the benefits of liquid in handling, storage and transportation, and **enables coal to be used sight unseen**.

The technical feasibility of producing and utilizing a premium LRCWF made from ultra-low sulfur Alaskan subbituminous coal following hydrothermal treatment has been demonstrated at a pilot plant-scale. This LRCWF performed well in combustion tests giving excellent carbon burnout, minimal fouling, and SO_x emissions below the most stringent requirements. Process economics suggest that

LRCWF can be made from Beluga, Alaska LRC and shipped to Japan for below $17 per barrel on an oil equivalent basis. The cost for Wyoming LRCWF is about 25% less than than Alaskan LRCWF at the mine, which will offset the greater shipping costs and bring a low-cost, non-hazardous oil substitute to the industrial Gulf Coast.

A successful demonstration will offer many commercial opportunities including, sales of US made LRCWF to utility and industrial oil users, to advanced power producers using slurry-fed gasifiers, and heat engines, export to the major oil importers in the Pacific Rim, and exporting US technology, engineering, equipment and instrumentation to developing nations, particularly in Asia and Eastern Europe. The critical need is a commercial scale demonstration to support scaleup design and process economics, determine derating in oil-designed boilers and advanced power systems, and a facility capable of supplying thousands of tons of LRCWF for testing in potential end-users' facilities.

Silverado owns a gold recovery plant, idled due to low gold prices, that has about half of the equipment needed for a LRCWF demonstration plant and ample space in the buildings to accommodate the remaining equipment. Silverado has also assembled a team with all the engineering and LRCWF expertise necessary for commissioning and operating a LRCWF production and boiler test facility. The Team capabilities coupled with the existing Silverado facilities would enable a LRCWF demonstration plant to come on line much faster and at a fraction of the cost of a new plant built anywhere in the US.

PUBLIC ABSTRACT

Applicant (primary) name: Southern Company Services, Inc.
Applicant's address: 600 North 18 th Street Birmingham AL 35291
Street City State Zipcode

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

Southern Co. Svcs. Birmingham AL 35291
Name City State Zipcode

Peabody Energy St. Louis MO 63101
Name City State Zipcode

Kellogg Brown and Root Houston TX 77002
Name City State Zipcode
(Use continuation sheet if needed.)

Proposal Title: 300-MW Demonstration of Coal Gasification Power Generation, Incorporating an Air-Blown KBR Transport Gasifier

Commercial Application: X New Facilities X Existing Facilities
_ Other, Specify:

Technology Type: Conversion (Gasification)

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 719,506,512
Estimated DOE Share: $ 250,000,000
Estimated Private Share: $ 469,506,512

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s):

Greene County AL 36732
Location (city, county, etc.) State Zipcode

McKinley County NM 87020
Location (city, county, etc.) State Zipcode

McKinley County NM 87013
Location (city, county, etc.) State Zipcode

Randolph County IL 62286
Location (city, county, etc.) State Zipcode

Warrick County IN 47619
Location (city, county, etc.) State Zipcode

Type of coal to be used:

U.S. PRB (sub-bituminous) U.S. Bituminous
Primary Alternate (if any)

Size or scale of project: 3322
Tons of coal/day input

And/or

297 MW Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 112
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, interested parties should contact:

Randall Rush
Name

Director – Power Systems Development Facility
Position

(205) 670-5842
Telephone Number

Southern Company Services, Inc.
Company

rerush@southernco.com
e-mail address

P.O. Box 1069
Address

Wilsonville AL 35186
City State Zipcode

Alternative Contact:

Tim Pinkston
Name

Tech. Mgr. – Power Systems Development Facility
Position

(205) 670-5860
Telephone Number

Southern Company Services, Inc.
Company

tepinkst@southernco.com
e-mail address

P.O. Box 1069
Address

Wilsonville AL 35186
City State Zipcode

PUBLIC ABSTRACT (cont'd)

Brief description of project:

Demonstration of an air-blown transport reactor integrated gasification (TRIG™) combined cycle power plant is proposed. The transport reactor design is based on Kellogg Brown and Root's fluidized catalytic cracker technology used successfully for over 50 years in the petroleum refining industry to produce gasoline from middle distillates.

The demonstration unit will generate 297 MW (net) at 44.4 percent efficiency (LHV), a heat rate of 7,680 Btu/kWh. It will be the cleanest, and when adjusted for local conditions, most efficient coal-fired power plant technology in the world. The demonstration unit design involves a single gasifier/gas turbine train and one steam turbine. This configuration is sometimes referred to as 1-on-1. Following demonstration at this size, scale up to a more economical 600 MW 2-on-1 configuration can be achieved at no risk since only the steam turbine will increase in size.

The gasifier is fed with nominally 140 tons/hr of sub-bituminous coal and 4 tons/hr of limestone for in-situ sulfur capture. Syngas with a nominal heating value of 110 Btu/SCF is fired in a General Electric 7FA turbine generating 197 MW. The gas turbine flue gas discharges into a single pressure, heat recovery steam generator (HRSG). High-pressure saturated steam raised in the HRSG is mixed with steam from a syngas cooler, superheated in the HRSG and expanded through a reheat steam turbine operating at 1,815 psia/1,000°F/1,000°F. The steam turbine output is 118 MW.

Within the HRSG, a unit for selective catalytic reduction (SCR) of NOX is installed after the evaporator circuit where the flue gas is in the optimal temperature range of 600 to 700°F. After the HRSG, the flue gas passes through a flue gas treatment (FGT) unit that incorporates a proprietary Southern Company modification that lowers emissions. This FGT unit removes almost all the environmental species of interest, including sulfur dioxide and trioxide, hydrogen chloride, hydrogen fluoride, ammonia slip from the SCR unit, oxidized and unoxidized mercury, trace elements, and volatile organic compounds. Char and ash are removed from the gasifier island, water is added for dust suppression, and the mixture is disposed of in a landfill that is designed to collect and recycle rainfall for use in the demonstration unit. Tests show that the char and ash from the gasifier are non-hazardous.

PUBLIC ABSTRACT

Applicant (primary) name: Robinson Run Power, LLC

Applicant's address: 1040 Great Plain Avenue, Needham, MA 02492-2517
Street City State Zipcode

Team Members (if any): T. W. Wheble, Robinson Run, Needham, MA 02492
(listing represents only participants at time of application, not necessarily final team membership)
Name City State Zipcode

M. Dugan, Robinson Run, Frederick, MD 21703
Name City State Zipcode

Will Goss, McMurray, PA 15317
Name City State Zipcode

Proposal Title: Dry Absorption Process (DAP)

Commercial Application: XX New Facilities XX Existing Facilities

9 Other, Specify: _____

Technology Type: Emission Control – Coal-Fired Power Plants

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 24,300,000

Estimated DOE Share: $ 12,000,000

Estimated Private Share: $ 12,300,000

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Monongalia County, West Virginia
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Eastern bituminous
Primary Alternate (if any)

Size or scale of project:
Tons of coal/day input
And/or
600 MW (net) Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 111
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, interested parties should contact: Name

Thomas W. Wheble

Project Manager
Position

(781) 444-9980 x226
Telephone Number

Robinson Run Power, LLC
Company

tom_wheble@genpower.net
e-mail address

1040 Great Plain Avenue
Address

Needham, MA 02492
City State Zipcode

Alternative Contact:

Christopher Colbert
Name

Vice President, Coal Development
Position

(781) 444-9980 x246
Telephone Number

Robinson Run Power, LLC
Company

chris_Colbert@genpower.net
e-mail address

1040 Great Plain Avenue
Address

Neehman, MA 02492

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Dry Absorption Process Demonstration Robinson Run Power Plant

This Clean Coal Project demonstrates an emerging multipollutant control technology that will target reduction of sulfuric acid mist (H_2SO_4) and mercury, and potentially other heavy metals in a single process. The project will be demonstrated at Robinson Run Power, a 600 MW clean coal power plant currently under development. Robinson Run Power will have a stringent limit for NO_x emissions that will be achieved through the use of an SCR system. Operation of an SCR system downstream of a boiler firing high sulfur coal will increase the formation of SO_3. The current boiler flue gas emission control technology uses a wet ESP for acid mist removal and relies on the particulate control device for removal of metals or to inject an expensive activated carbon sorbent. This project treats the boiler exhaust gas with a lime-based sorbent in a dry absorption process (DAP) reactor to facilitate removal of hazardous air pollutants in a downstream conventional fabric filter baghouse. This process eliminates the need for a wet ESP. This project provides a unique opportunity to collect large-scale, long-term operational data on the effects of mercury and acid gas collection efficiencies.

PUBLIC ABSTRACT

Applicant (primary) name: Phoenix Materials Company

Applicant's address: 40 Pearl Street Suite 838 Grand Rapids MI 49503
Street City State Zip code

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

Proposal Title: Phoenix Materials Company

Commercial Application: X New Facilities ___ Existing Facilities

___ Other, Specify:

Technology Type: Environmental Performance

Estimated total cost of project: $11,000,779.00
(May not represent final negotiated costs.)

Total Estimated Cost: $ $11,000,779.00

Estimated DOE Share: $ $5,250,779.00

Estimated Private Share: $ $5,750,000.00

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s): West Olive, Ottawa County MI 49460
Location (city, county, etc.) State Zip code

Type of coal to be used: Fly ash (CCP)

Size or scale of project: N/A
Tons of coal/day input

And/or

353 tons/day of fly ash
Other (if necessary)

Duration of proposed project: Indefinite
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, interested parties should contact:

Philip Blanchard
Name

President
Position

(616) 742-5560
Telephone Number

Phoenix Materials Company
Company

40 Pearl Street Suite 838
Address

Grand Rapids MI, 49503
City State Zip code

PUBLIC ABSTRACT (cont'd)

Brief description of project:

Phoenix Materials Company has been formed to build and operate several concrete production facilities with the first to be located in West Michigan. The plant will commercialize an innovative technology that requires low capital costs and results in a product that not only offers performance advantages to traditional concrete, but also a cost advantage relative to other construction materials. In addition, the technology used in the production process aims to help alleviate an environmental concern of electric utilities, as more than 50% of the raw material input is fly ash, the largest coal combustion by-product (CCP).

PUBLIC ABSTRACT

Applicant (primary) name: Ohio University

Applicant=s address: 1 Riverside Drive, Athens, Ohio 45701
Street City State Zipcode

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

American Electric Power
American Air Liquide
Ohio Coal Development Office
Gas Technology Institute
Battelle
McDermott Technology

(Use continuation sheet if needed.)

Proposal Title: The Hocking Valley Advanced Coal Gasification Combined Heat and Power Facility

Commercial Application: XX New Facilities **9** Existing Facilities

9 Other, Specify: _____

Technology Type: U-GAS and Fuel Cell

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $133,950,016

Estimated DOE Share: $ 66,975,008

Estimated Private Share: $ 66,975,008

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Ohio University, Athens, OH 45701
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: _____ _____
Primary Alternate (if any)

Size or scale of project: 300% increase in coal use by University
Tons of coal/day input
And/or
_____ Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 96
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Name: Thea R. Arocho

Position: Associate Director, Research and Sponsored Programs

Telephone Number: (740)593-2856

Company: Ohio University

e-mail address: Arocho@ohio.edu

Address: _____

City State Zipcode

Alternative Contact:

Name: _____

Position: _____

Telephone Number: ( )

Company: _____

e-mail address: _____

Address: _____

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Ohio University, located in the heartland of America's Midwest high-sulfur coal fields, has assembled a team of industry leaders to demonstrate the capability and accelerate the commercial deployment of advanced coal-based combined cycle gasification and fuel cell technology to reduce costs for industrial/commercial scale facilities using coal for combined heat and power systems. The partners of the Hocking Valley Advanced Coal Gasification Combined Heat and Power (ADC-CHP) Facility Project include: Ohio University, American Electric Power, Gas Technology Institute, McDermott Technology Inc. and American Air Liquide. The State of Ohio Coal Development Office will be a co-funder for this project; Battelle will participate as a technical advisor.

To produce both electricity and steam for the Ohio University campus, coal will be gasified using a pressurized oxygen-blown, fluidized-bed gasification system known as U-GAS ®. The technology reduces the hydrocarbons in the coal to CO and H2, commonly called synthesis gas.

Particulates and sulfur gases with the syngas will be removed before combustion of the syngas in a gas turbine. The gas turbine-generator set produces about 14 MW of power. A 50 kWe planar solid oxide fuel cell will be installed and operated first with natural gas, with plans for conversion and operation on synthesis gas later. The process heat from both conversion devices can be used to produce steam, which will drive a 5 MW steam turbine to produce additional electricity before being used in the campus district heating and cooling system. The preliminary design for the proposed Hocking Valley ACG-CHP Facility would net 14 MW of electrical power generation, while supplying in excess of 100,000 pounds per hour of steam.

The Hocking Valley ACG-CHP Facility addresses many of the goals and objectives of the Clean Coal Power Initiative. As a combined heat and power system using coal, it offers the potential to achieve a greater level of overall energy efficiency, lower energy costs, and reduce carbon emissions. The gasification system use 100% coal and will increase the University's coal use by nearly 300% in providing heat and power to the campus, while significantly reducing the emissions of SO2 and NOx compared to Ohio University's current stoker-boilers. By using oxygen-blown gasification, carbon dioxide will be a richer fraction of the gas stream, eliminating the cost of nitrogen separation in the hot flue gas, making potential capture and later sequestration possible. By incorporating a fuel cell into the system, the potential for high-efficiency, low-cost heat power may be realized.

Further, the Hocking Valley ACG-CHP Facility brings together industrial and academic organizations that are significantly involved with development of future power generation technology necessary to meet the goals of the Department of Energy's Vision 21 program. Such teaming is synergistic with other CCPI objectives, including the opportunity to install and test new and advanced instrumentation, both on line and in the synthesis gas slipstream, the opportunity to demonstrate new design features of modern small steam turbines, and other commercial opportunities including aero-derivative or other advanced turbines.

The use of coal in larger "distributed" power generation, such as combined heat and power, also serves to address the President's objectives of promoting national security. By using coal instead of natural gas, which

currently is the dominant fuel for this application, not only could long-term energy prices be stabilized and reduced, but also the increase in fuel diversity should make upsets in fuel supplies less likely. Further, by increasing the use of distributed power, efficiency is improved by elimination of electrical transmission losses. And finally, the use of distributed combined heat and power systems improves the security of the electric power grid through reduction in the dependence on the large centralized station for all electrical power.

The Hocking Valley ACG-CHP Facility will serve as a nearly ideal demonstration for a potentially large market currently untapped by coal-fired systems. Throughout the United States, many large industrial, academic, and municipal complexes are heated or supplied with process steam using coal-fired boilers. Without cost-effective alternatives, as these boilers age beyond economic usefulness, they are being replaced with gas “package” boilers and power systems.

The real need to reduce and stabilize fuel costs, as well as produce electricity at the point of demand, have created a market for small-scale combined cycle combined heat and power systems. A demonstration of a cost-effective coal-based system is critical to the expansion of coal into this important energy market.

PUBLIC ABSTRACT

Applicant (primary) name: N-Viro International Corporation

Applicant's address: 3450 W. Central
Toledo, Ohio 43606

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

Name	Terry J. Logan, Ph.D.	
City	Columbus	
State	Ohio	Zipcode 43212
Name	Robert F. Nicholson, MBA	
City	Toledo	
State	Ohio	Zipcode 43606
Name	Cindy L. Drill, M.S	
City	Toledo	
State	Ohio	Zipcode 43606

Proposal Title: Environmental & Economic Performance Evaluation of a Biofuel (N-Viro Fuel) Coal Additive

Commercial Application: New Facilities X Existing Facilities

Other, Specify:

Technology Type: Clean Coal Technology

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 990,157

Estimated DOE Share: $ 495,078

Estimated Private Share: $ 495,079

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s):

Location (city, county, etc.) North Bend State OH Zipcode

Location (city, county, etc.) East Lansing State MI Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Eastern Blend

Primary Alternate (if any)

Size or scale of project: 10,000
Tons of coal/day input

And/or

1400 Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project:
(From date of award) 36 (Months)

PRIMARY CONTACT:
For additional information,
interested parties should contact:

Name Robert F. Nicholson

Position Project Mgr.
Company N-Viro International, Corp.
(419)535-6374 Address 3450 W. Central Ave., Ste 328
Telephone Number City Toledo, OH 43606

Rfn@nviro.com
e-mail address

Alternative Contact:

Name Tim Nicholson

Position Site Liaison

(419) 535-6374
Telephone Number Company N-Viro International, Corp.
Address 3450 W. Central Ave., Ste 328
Toledo, OH 43606

Tnich@nviro.com
e-mail address

PUBLIC ABSTRACT (cont'd)

Brief description of project:

N-Viro International Corporation (the "Company" or "N-Viro") owns and licenses patented technologies to treat and recycle wastewater sludge's and other bio-organic wastes, utilizing certain alkaline and mineral by-products produced by cement, lime, electric utilities and other industries (the "N-Viro Process"). Additionally, the Company has also operated N-Viro facilities for third parties on a start-up basis and currently operates one N-Viro facility on a contract management basis for the City of Toledo. There are currently over 80 wastewater treatment facilities throughout the world treating sludge using the N-Viro Process. The Company estimates that these facilities are treating and recycling sludge at an annualized rate of over 140,000 dry tons per year. N-Viro is a publicly, traded company whose common stock is traded on the Open Counter Bulletin Board Market.

Grant Request for N-Viro Fuel™ Technology Development
The Company has recently received approval of its patent application and is currently finalizing the commercialization of a product that uses the N-Viro Process to create a fuel supplement and additive for coal burning power plants (N-Viro Fuel™). The N-Viro Fuel product will provide a low cost fuel source and will reduce "greenhouse gases" generated during the coal burning process. The Company is seeking federal and / or state grants for the purpose of supporting the testing and full-scale demonstration of its N-Viro Fuel™ Technology.

Testing Phase
The first full-scale test phase of the N-Viro Fuel Technology will involve at least three tests: (1) the handling test and (2) the stack test (3) economic performance testing. We will also be using two sites, one pulverized bed and one fluidized bed to accurately represent the systems used in the industry.

The handling test is a test to be conducted at a coal-burning power plant whereby at least 200 tons of N-Viro Fuel will be tested to ensure that the N-Viro Fuel can be handled and conveyed through the plant's existing coal handling and conveyance systems. Sludge and other organic waste materials to be used to make N-Viro Fuel could not be handled and conveyed through existing material handling and conveyance systems due to their physical characteristics.

The stack test is a test to be conducted at a coal-burning power plant whereby at least 1,000 tons of N-Viro Fuel will be combusted in the power plant for the purpose of evaluating the impact of N-Viro Fuel on BTU generation, emissions, economic impacts and other aspects of commercial power plant operation.

Benefits
N-Viro Fuel, as both a fuel supplement and additive, is expected to provide a number of benefits including:

- Availability of a low cost, renewable energy resource close to power generating facilities.

- Physical and chemical characteristics similar to that of coal, allowing the use of existing fuel handling and conveyance systems.
- Ability to use organic waste streams such as sewage sludge, animal manure, pulp and paper waste as a fuel source.
- Favorable BTU value
- Combustion temperatures similar to coal, thereby providing required stability of fuel in handling and conveyance systems including fuel pre-heaters.
- Enhanced combustion stability of organic wastes.
- Substitute for sorbant material including lime, anhydrous ammonia and other materials used to scrub sulfur dioxide and nitrous oxides from the combustion off-gases.
- N-Viro Fuel contains between 20% and 45% water, depending on desired blend. The water can be used to decrease flame temperatures, and thus provide reduced NOx emissions.
- Use of lime and limestone contained in the N-Viro Fuel can be used as a sorbent to scrub SOx.
- Treated to Class A, EQ (as defined by US EPA) to provide a pathogen-free product that can be safely handled by plant personnel.
- Potential to generate carbon credits by utilizing sludge destined for incineration, for the production of N-Viro Fuel.

PUBLIC ABSTRACT

Applicant (primary) name: Nissho Iwai American Corporation

Applicant's address: 1211 Ave. Americas, New York, NY 10036
Street City State Zipcode

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

Nissho Iwai Corp., Tokyo, Japan 135-8655
Name City State Zipcode

Kobe Steel, Ltd., Kobe, Japan 651-2271
Name City State Zipcode
Name City State Zipcode
(Use continuation sheet if needed.)

Proposal Title: UBC Coal Beneficiation Process for PRB Coals

Commercial Application: **X** New Facilities **X** Existing Facilities
Other, Specify: _____

Technology Type: Beneficiation of Low Rank (Powder River Basin) Coal

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $56,777,944
Estimated DOE Share: $28,388,972
Estimated Private Share: $28,388,972

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s): Black Thunder Mine, Wright, WY 82732
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Powder River Basin sub-bituminous
Primary Alternate (if any)

Size or scale of project: 1000
Tons of coal/day input

And/or

Megawatts, Barrels per day, etc.

Other (if necessary)

Duration of proposed project: 54
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact:

Mr. Shuhei Inoue
Name

Senior Vice President & General Manager
Position

(212) 704-6635
Telephone Number

Nissho Iwai American Corp.
Company

Fugimoto_t@niac.com
e-mail address

1211 Avenue of the Americas
Address

New York NY 10036
City State Zipcode

Alternative Contact:

Mr. Yukio Tada
Name

VP & General Mgr., Washington Office
Position

(202) 429-8680
Telephone Number

Nissho Iwai American Corp.
Company

Suziedelis_d@niac.com
e-mail address

900 19th Street, N.W., Suite 750
Address

Washington DC 20006
City State Zipcode

PUBLIC ABSTRACT (cont'd)

Brief description of project:

The applicant proposes to construct a 1,000 ton per day coal processing demonstration facility at the Black Thunder Mine to upgrade low rank Wyoming sub-bituminous coal into a higher grade coal having higher heating value and lower moisture. The UBC (Upgraded Brown Coal) process is a non-chemical process that utilizes heat to remove moisture from the coal and then adds a small quantity of asphalt and light oil to produce a stable, higher-grade coal.

The higher rank coal produced is a stable fuel, unlike Wyoming sub -bituminous coal, that is not subject to self-heating (spontaneous combustion). Improving the stability and increasing the heat content of the Wyoming sub bituminous coal results in a larger market for the fuel as it can be substituted for or blended with higher rank coals in use in existing facilities.

The UBC processing plant will be constructed on a site requiring approximately three acres. The site will require road access for supply of raw coal, asphalt and light oil used as feed stock for production of UBC and boiler fuel (probably No. 2 fuel oil) and road or railroad access for shipment of processed UBC. Additionally, the plant will require electricity and cooling water.

The proposed location on the Black Thunder Mine site is advantageous because it will not result in additional highway traffic for coal supply and product shipment from the demonstration plant to a shipping facility as coal production and shipping facilities already exist on the Black Thunder Mine property.

Heat for the UBC process is provided by steam produced on site by a conventional low pressure industrial boiler. The UBC process itself does not result in combustion or produce combustion products and consists entirely of mechanical processes to reduce the size of the coal particles; mix the coal; asphalt, and oil at elevated temperatures; heat the coal to evaporate moisture; separate and recover the excess oil/asphalt mixture; and briquette the UBC for improved storage and handling.

The only discharge to the environment from the UBC process is a wastewater stream that will be discharged to the normal drainage features after treatment in accordance with all environmental regulations. Atmospheric emissions will be produced by the combustion of fuel oil or gas in a 50,000 pound per hour industrial boiler used to produce steam for the process.

The plant will require approximately 25-30 permanent employees for operation, maintenance, and administrative functions. Additional contract services will be required to provide outage and heavy maintenance and to supply the plant with asphalt, light oil, boiler fuel, spare parts, and other supplies.

PUBLIC ABSTRACT

Applicant (primary) name: NeuCo, Inc.

Applicant's address: 200 Clarendon Street
Hancock Tower, T-31
Boston, MA 02116

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

Name	City	State	Zipcode
Name	City	State	Zipcode
Name	City	State	Zipcode

(Use continuation sheet if needed.)

Proposal Title: Development and Demonstration of Integrated Optimization Software at the Baldwin Energy Complex

Commercial Application: X New Facilities Existing Facilities X

9 Other, Specify:

Technology Type: Advanced Optimization Software

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 18,640,231

Estimated DOE Share: $ 8,388,104

Estimated Private Share: $ 10,252,127

PUBLIC ABSTRACT (contd.)

Anticipated Project Site(s): Baldwin Energy Complex, Baldwin, IL 62217
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Powder River Basin _____
Primary Alternate (if any)

Size or scale of project: 6000/tpd
Tons of coal/day input

And/or

1,768 MWe Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project:
(From date of award) (Months) 48

PRIMARY CONTACT:
For additional information,
interested parties should contact:

Peter J. Kirk
Name

Vice President, Business Development
Position

(617-425-3370)
Telephone Number

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Company

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e-mail address

200 Clarendon Street
Hancock Tower, T-31
Address

Boston MA 02116
City State Zipcode

Alternative Contact:

Peter J. Spinney
Name

Market and Competitive Assessment
Position

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Address

Boston MA 02116
City State Zipcode

PUBLIC ABSTRACT (continued)

Brief description of project:

NeuCo proposes to design, develop, and demonstrate integrated on-line optimization systems at Dynegy Midwest Generation's Baldwin Energy Complex, which has agreed to serve as the host site for the project. The modules to be developed as part of this project will address sootblowing, SCR operations, overall unit thermal performance, and plant-wide profit optimization. The benefits will take the form of reduced NOx, increased fuel efficiency, and reliability. The increases in fuel efficiency (heat rate reduction) will also provide commensurate reductions in greenhouse gases, mercury, and particulates.

These solutions will build on NeuCo's ProcessLink™ technology platform. This technology was first applied for combustion optimization at wall-, roof- and tangentially-fired boilers; this application over the last four years has been successfully commercialized and is now providing substantial NOx reduction and fuel efficiency benefits to owners and operators of pulverized coal units located throughout the United States. The proposed work will build on this success by 1) demonstrating closed-loop combustion optimization for cyclone boilers; and 2) integrating the above-described newly developed solutions with combustion optimization, at all three of the plant's 600 MW coal-fired units.

The ProcessLink technology platform includes neural networks, genetic algorithms and fuzzy logic techniques from which to comprehensively apply optimization techniques to a variety of systems within coal power plants through existing control technologies and then link these systems to each other. It also supports the development of integrative optimization solutions, which use system-specific optimization applications as data sources and actuators. The overall architecture of this platform is designed to permit flexible deployment strategies; rather than requiring that all data and logic be resident on a single computer, the service model allows applications to leverage networked computational resources. Thus core to the design principles employed here is an application architecture built around interoperable services for the provision of high-value process management and business logic.

The proposed project will take place over a four year period from Calendar Year 2003 - 2006. A primary objective will be to develop the technology so as to maximize the overall benefits for the coal-fired power generation industry in the United States.

Nordic Energy of Ashtabula, LLC
DE-PS26-02NT41428
August 1, 2002

PUBLIC ABSTRACT

Applicant (primary) name: Nordic Energy of Ashtabula, LLC

Applicant's address:

2010 Hogback Rd, Suite #4, Ann Arbor, MI 48105

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

Gasification Engineering Corp., a Global Energy Company
1000 Louisiana, Suite 3800, Houston, TX 77002

Proposal Title: **Ashtabula Advanced Gasification Coproduction Facility**

Commercial Application X New Facilities X Existing Facilities

Other, Specify:

Technology Type: E-GAS™ Gasification Technology

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $1,230,000,000.00

Estimated DOE Share: $ 150,000,000.00

Estimated Private Share: $1,080,000,000.00

Anticipated Project Site(s): Ashtabula Township, Ashtabula County, Ohio

Type of coal to be used: Bituminous

Size or scale of project: nominal 800 MWe

Duration of proposed project: January 2003 to June 2011

PRIMARY CONTACT:
For additional information,
interested parties should contact:

Joni M. Fixel
Vice President of Development
Nordic Energy of Ashtabula, LLC
2010 Hogback Rd, Suite #4,
Ann Arbor, MI 48105
734.973.7700 x-101
jfixel@nordicenergy.com

Alternative Contact:

Phil Amick
Vice President, Commercial Development
Gasification Engineering Corp., a Global Energy company
1000 Louisiana, Suite 3800
Houston, TX 77002
713.374.7252
pramick@globalenergyinc.com

PUBLIC ABSTRACT (cont'd)

Brief description of project:

Integrating Clean Coal Technologies and Cogeneration Opportunities with Industrial Land Reuse

Nordic Energy of Ashtabula, LLC (Nordic) will build, own and operate a commercial scale, clean coal technology electric generation plant near Ashtabula, Ohio. The Nordic plant will utilize the E-Gas™ integrated gasification combined cycle technology owned by Global Energy, Inc. (Global) of Cincinnati, Ohio. The plant will be capable of producing a net output of approximately 800 Mwe, in what will be one of the cleanest coal fired power plants in the world. New technology gives Nordic the opportunity to produce power with virtually no particulate emissions. This project is structured as a cogeneration facility with a portion of the power and steam from the power plant being used in the ethanol and dry grains production process in a neighboring facility.

The Ashtabula Advanced Coal Gasification Coproduction Facility will be built by Nordic on vacant industrial land that once was owned and used by Union Carbide Corporation. The land has not been used in over 30-years and small areas of the land had been used for solids storage from past ferroalloy processes. Working with Elkem Metals Company and the Ohio Environmental Protection Agency, Nordic was able to become involved in the resolution and removal of the solids. The material was characterized according the state guidelines and moved to other locations for proper management. Through these joint efforts, a piece of land that had potential environmental challenges and no foreseeable future use, will now house both a generation plant and ethanol processing facility with potential synergistic fence line agreements with Elkem and several other neighboring chemical facilities.

Nordic remains committed to the use of environmental responsible technology for the production of electricity using one of America's most abundant fuel sources, coal. The E-Gas™ process is currently operational at the Wabash River Coal Gasification Repowering Project (Wabash) in Terre Haute, Indiana, which was built under the Department of Energy's Clean Coal Technology program. Air emissions at Wabash, in operation since 1995, are lower than conventional technology coal plants that have been permitted for operation in 2005. Even while using higher sulfur coal, the plant has SO2 emissions as low as one fortieth of the Year 2000 Clean Air Act Standards. The plant has virtually no particulate emissions as well.

The Nordic plant will be unique and different than the Wabash plant in many ways. The next generation E-Gas™ gasifier technology, used in the project, will improve overall cycle efficiency. Even greater sulfur dioxide removal than Wabash is planned, and NO x emissions will also be lower. With mercury from coal fired generation becoming a growing environmental concern, the Nordic plant will contain a mercury capture system that will remove an estimated 90% of the mercury from the traces found in the coal. The Ashtabula plant will also be multi-train facility, improving availability

and reliability of electricity generation while reducing the installed cost by virtue of economies of scale. Commercial operation is scheduled for June 2007, followed by a four-year demonstration as part of the DOE Clean Coal Power Initiative. Including the planned four-year demonstration for the Department of Energy, the project is estimated to cost $1,230,000,000 excluding fuel costs. Under the Clean Coal Power Initiative, the Department of Energy will provide $150 million of this amount, approximately 12% of the total.

Nordic is investigating the potential use of hydrogen fuel cells for future applications in plant processes. A proponent of new technologies, Nordic looks for advances in processing to meet consumers' needs. Nordic's goal is to show how the IGCC process used in a series of gasifiers can produce reasonably priced generation for sale into the deregulated market. Environmentally conscientious, Nordic believes that it has chosen the technology that can move coal base-load generation into the public's awareness by virtue of continued reliability with emissions approaching natural gas fired generators.

For more information, contact:

Joni Fixel, J.D.
Nordic Energy of Ashtabula LLC
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jfixel@nordicenergy.com

Phil Amick
Vice President, Commercial Development
Gasification Engineering Corp., a Global Energy company
1000 Louisiana, Suite 3800
Houston, TX 77002
713.374.7252
pramick@globalenergyinc.com

PUBLIC ABSTRACT

Applicant (primary) name: McDermott Technology, Inc.

Applicant's address: 1562 Beeson Street (Street) Alliance (City) OH (State) 44601-2196 (Zipcode)

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

Name	City	State	Zipcode
Duke Energy	Charlotte	NC	28102
Babcock & Wilcox Co.	Barberton	OH	44203-0351
CONSOL Energy Inc.	South Park	PA	15129

(Use continuation sheet if needed.)

Proposal Title: Cliffside Optimal Multi-Pollutant Abatement System

Commercial Application: New Facilities Existing Facilities

Other, Specify:

Technology Type:

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 148,586,818

Estimated DOE Share: $ 74,281,881

Estimated Private Share: $ 74,304,937

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s): Cliffside, Rutherford County NC
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Northern Appalachian Blacksville #2
Primary Alternate (if any)

Size or scale of project: 5,327
Tons of coal/day input

And/or

592 MWe Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 48
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Dennis K. McDonald
Name
Manager, Functional Technology
Position
(330) 860-6175
Telephone Number
Babcock & Wilcox Company
Company
20 South Van Buren Avenue
Address
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Barberton OH 44203-0351
City State Zipcode

Alternative Contact:

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Name
Business Development Manager
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20 South Van Buren Avenue
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rwtelesz@babcock.com
e-mail address
Barberton OH 44203-0351
City State Zipcode

PUBLIC ABSTRACT (cont'd)

Brief description of project:

This proposed CCPI project, "Cliffside Optimal Multi-Pollutant Abatement System" (COMPAS), will be a full-scale demonstration of a cost-effective system to attain overall excellence in coal-fired power plant emissions control. As part of Duke Energy's effort to satisfy anticipated environmental control regulations, the project will retrofit Unit 5 at the Cliffside Steam Station (CS 5) with an array of integrated/synergistic emissions technologies provided by Babcock & Wilcox Company. Upon successful implementation of the COMPAS project, CS 5 will be among the cleanest coal-fired power plants in the U.S.

The Cliffside steam station is located on a 1100 acre site in southwestern North Carolina, near the town of Cliffside. The newest generating unit, CS 5 went into commercial operation in 1970. CS 5 was recently retrofitted with a new SCR and low-NO_x combustion system. At 592 MW gross generating capacity, CS 5 is representative of the fleet of large, aging, but still economically viable domestic generating units.

The COMPAS project will provide a multi-pollutant control system that will attain very low emissions levels for the individual pollutants and the aggregate total. Performance targets for the plant include the following: SO_2 reduction of 99.5%, a higher removal rate than that of any existing domestic coal-fired plant, and concomitant acid gas reductions; total particulate (including solids, sulfuric acid mist, and $PM_{2.5}$) emissions reduction to 0.006 lb/MBtu, about 40% below the most stringent level permitted today (with H_2SO_4 mist not included), and the associated reduction of "blue haze" plumes; mercury emissions reductions corresponding to at least 90% of the mercury contained in the fired coal; NO_x emissions, controlled through SCR and low-NO_x combustion system installed separately from this CCPI project, reduced to levels near the lowest of any domestic coal-fired plant.

The multi-pollutant abatement concept is based on understanding of the characteristics of gas streams and the design, sequencing, and integration of contaminant control components for maximum synergistic benefits. A core component of COMPAS technology is the Integrated Advanced Tower, which integrates wet scrubbing, wet electrostatic precipitation, mercury removal and liquor handling functions for optimal results. The total costs for the system will be below the total for separate components designed to attain the performance targets without the synergistic advantages.

After installation of the COMPAS facilities, a six-month performance test phase will be conducted. Fuel for the CS 5 test period is to be a northern Appalachian coal of 3% nominal sulfur content, to be provided by CONSOL Energy. A commercial level of availability is anticipated, beginning with the first year of commercial operation. The Babcock & Wilcox Company will provide overall project management for the four year duration of the project; and McDermott Technology Inc. will manage the CCPI contract with DOE.

PUBLIC ABSTRACT (cont'd)

The technologies demonstrated will be widely applicable in the near term for such potential commercial deployments as retrofits into existing plants for which flue gas desulfurization scrubbers are envisioned and as initial installations in new plants. Coal is our nation's primary indigenous energy resource. A successful outcome of the COMPAS project will provide cost effective options to satisfy our nation's energy and environmental needs – allowing our existing coal-fired fleet to continue operations in an environmentally responsible manner; facilitating the construction of new coal-based generation; and, thereby, contributing significantly to our nation's energy security.

PUBLIC ABSTRACT

Applicant (primary) name: LG&E Energy Corporation

Applicant=s address: 220 W Main Street, Louisville, KY 40202
Street City State Zipcode

Team Members (if any): McDermott Technology, Inc. Alliance, OH 44601
(listing represents only participants at time of application, not necessarily final team membership)
Name City State Zipcode

Babcock & Wilcox Company, Barberton, OH 44203
Name City State Zipcode

USFilter, Plainfield, IL 60544
Name City State Zipcode

Airborne Pollution Control, Calgary, AB Canada T2H1J5
Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Commercial Demonstration of the Airborne Process

Commercial Application: XX New Facilities XX Existing Facilities

9 Other, Specify: _____

Technology Type: Environmental Performance

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 120,126,569

Estimated DOE Share: $ 31,122,268

Estimated Private Share: $ 89,004,301

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Carrollton, Carroll County, KY
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: Eastern Kentucky Bituminous
Primary lternate (if any)

Size or scale of project: 6,360 tpd
Tons of coal/day input

And/or

524 MW Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 51
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, interested parties should contact: Name

Don Miller

Director of Project Development
Position

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Telephone Number

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Company

don.miller@lgeenergy.com
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Alternative Contact: Philip Imber
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Chemical Engineer
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Philip.imber@lgeenergy.com
e-mail address

220 West Main Street
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Louisville, KY 40202
City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

LG&E Energy will lead the "Commercial Demonstration of the Airborne Process" Clean Coal Power Initiative project. This will be a cost-effective, full-scale demonstration of advanced emission control technologies integrated with existing emissions control equipment that will result in multi-pollutant emissions abatement while providing a highly desired, valuable fertilizer byproduct.

The goals of this project are as follows: LG&E Energy will retrofit its 524 MWe (gross) Ghent Unit 2 facility with the "Airborne Process" with the goal of removing 99.5% of sulfur dioxide (SO_2), 90% of SO_3 (sulfuric acid mist precursor), 90% of nitrogen oxides (NO_x), and 90% of the mercury across the total system, while turning the byproducts into a high-quality, valuable granular fertilizer. This fertilizer will produce a revenue stream for LG&E Energy while yielding stack emissions that will be lower than other coal-fired units currently in service in the Nation. To accomplish this goal, sodium based scrubbing will be used in conjunction with an innovative process for the regeneration of sodium bicarbonate, which can then be granulated using the state-of-the-art Airborne Process to produce high purity, valuable fertilizer.

Kentucky Utilities ("KU"), a wholly owned LG&E Energy subsidiary, was incorporated in Kentucky in 1912 and incorporated in Virginia in 1991. It is a regulated public utility engaged in producing, transmitting, and selling electric energy. KU provides electric service to approximately 469,000 customers in over 600 communities and adjacent suburban and rural areas in 77 counties in central, southeastern, and western Kentucky, and to approximately 30,000 customers in 5 counties in southwestern Virginia. In Virginia, KU operates under the name Old Dominion Power Company.

The Ghent Generating Station, owned by Kentucky Utilities Company, is located on the Ohio River in Carroll County, about nine miles northeast of Carrollton, Ky. on US 42. This facility is the newest and largest of Kentucky Utilities' seven (7) generating stations. Its 1,670-acre grounds contain four electric generating units generating slightly over 2,100 megawatts of gross capacity. The plant itself stands 240 feet tall, or about 20 stories high, and the stacks rise 660 feet above the Ohio River Valley. Construction at Ghent began in 1970 with the total cost to date at approximately $1 billion. The first unit was placed in operation in December 1973, Units 2 and 3 were brought on line in 1977 and 1981 respectively, and Unit 4 went into service in the summer of 1984. The proposed retrofit of the Airborne Process will take place on Unit 2.

LG&E Energy will host this project as well as serving as the prime contractor with the Department of Energy. McDermott Technology Inc. will support LG&E by participating in the test program and providing management of the CCPI contract with DOE. The Babcock & Wilcox Company, USFilter, and Airborne Pollution Control will provide the technical and project management resources throughout the four-year project including design, installation, start-up and testing. Airborne Pollution Control holds the patents for the granulation process. B&W, USFilter and Airborne Pollution Control will provide the hardware for the dry sorbent injection and sodium based scrubbing system, regeneration system, and fertilizer production system respectively.

The Airborne Process can be widely applied in the near term to satisfy the emissions reduction needs for retrofits into existing plants that are currently un-scrubbed as well as for new coal-based installations. Coal is our nation's most abundant indigenous energy resource, and its use is essential to ongoing national security interests. A successful outcome of this project will provide a cost effective option to meet domestic energy and environmental concerns with particular application to un-scrubbed units in the existing coal-fired fleet as well as new coal-based generation.

Installation and startup will be followed by a three-month field test phase. The fuel for the test period will contain 3.6% sulfur. This test program will focus on multi-pollution emission reductions and production of the valuable fertilizer. The test program will also demonstrate the availability of the Airborne Process with the objective of achieving a commercial level of availability beginning with the first year of commercial operation.

This full-scale commercial demonstration brings together industry leaders in the fields of power generation, air quality control systems, and chemical plant design. The commercial demonstration team is comprised of LG&E Energy, Airborne Pollution Control, McDermott Technology, Inc., The Babcock & Wilcox Company, and USFilter.

PUBLIC ABSTRACT

Applicant (primary) name: Kentucky Mountain Power, LLC
Applicant's address: 2810 Lexington Financial Center,
Lexington, Kentucky 40507

Team Members (if any): None
(listing represents only participants at time of application, not necessarily final team membership)
(Use continuation sheet if needed.)

Proposal Title: Kentucky Mountain Power, baseload coal and gob fired electric generating facility

Commercial Application: New Facility

Technology Type: Clean coal technology

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $736,000,000*
Estimated DOE Share: $ 60,000,000*
Estimated Private Share: $676,000,000

*Reflects a portion of approximately $30,000,000 of coal/gob to be used during initial operation. Does not include almost $200,000,000 in "soft" costs and financing.

Anticipated Project Site(s): Kentucky Mountain Power, LLC, a baseload coal and gob fired electric generating facility.

Type of coal to be used: Run of mine coal (Primary) Gob (coal waste) (Alternate (if any)

Size or scale of project: Approximately 2,000,000 ton per year coal and 1,000,000 ton per year gob
Tons of coal/day input

And/or
Nominal 600 MW gross output Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 50 months
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, interested parties should contact: Joseph N. Darguzas
Name

Vice President
(Position

(859) 389-8070

Telephone Number

EnviroPower, LLC
Company

darguzas@aol.com
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2810 Lexington Financial Center
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Alternative Contact:

Robin Morecroft
Name

Project Manager
(Position

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Brief description of project:

Kentucky Mountain Power (KMP)
Baseload Coal and Coal Waste (Gob) Fired
Electric Generating Stations

In response to challenges raised by the President, the Vice President, and DOE efforts with the National Energy Policy Development Group and good corporate citizenship; KMP is developing what will hopefully be among the first wave of new, clean coal fired power plants.

The KMP project is a 525 MW CFB Boiler Project which will use a combination of waste coal (gob) and run-of-mine coal. The project will use multiple technologies and strategies to reduce the impact of the plant on the environment.

Although the tasks ahead are great, they are achievable. KMP can help to meet America's energy challenge utilizing government resources and our talents to produce a cleaner and healthier environment and a stronger economy in our country with a resulting brighter future for people wanting to work in those communities.

Our power plant project near the town of Hazard in the mountains of Eastern Kentucky has all the required permits and could begin construction immediately. However, the Project faces several unique challenges and opportunities, including:

- waste coal utilization
- implementing a multi-pollutant strategy
- benign stabilized disposal of coal ash
- co-generation water and steam supply
- energy efficiency
- fuel supply

While providing valuable data and experience that may well form the basis of many energy policy plans and show the way for new much needed power plants, Kentucky Mountain Power's projects will meet the energy needs of today. Those plants will offer a healthier environment, a stronger economy and a brighter future.

Our total Kentucky Mountain project costs, including financing and soft costs, will be approximately $900 million. Unfortunately, "day ahead" market traders have not monetized the present value of the future base load energy shortage and the need for clean coal, energy efficient.C-4 power plants as called for in the National energy Policy. Since they are now placing little value on these benefits, the Kentucky Mountain project may become stalled.

To enable this project to go forward quickly, we respectfully request your assistance in helping us to "level the playing field" by providing partial cost support for the following areas hereinbefore described in more detail:

waste coal utilization	$ 31 million
multi-pollutant strategy	24 million
coal ash disposal	10 million
co-generation	48 million
energy efficiency	42 million
fuel	30 million
	$185 million

If DOE could and would over the next few years co-fund $60,000,000 of the $185 million "extra" costs that are a part of our $900 million total project responsibility; then this project could be accelerated and used as an example for those that will need to follow. Overcoming this pioneer

premium will give other solid fuel developers the confidence that it can be done. In this way, DOE can show the way to increased American energy independence and help to meet the goals outlined in the National Energy Policy.

We would respectfully request that these funds be drawn down as they are expended on a roughly equal basis over a nominal three year construction period and then during our first year of operation. The first draw might be expected in Spring of 2003 as part of the FY03 budget and appropriations. $10 to $15 million federal co-funding per fiscal year could make the difference in Kentucky Mountain going forward in a timely manner or not.

Public Abstract

Applicant name: Indianapolis Power & Light Company, Indianapolis, IN 46217
Team Members: Phenix Limited, LLC, Oxnard, CA 93030 www.phenix-limited.com
Sargent & Lundy LLC Chicago, IL 60603
GE – Energy & Environmental Research Corporation, Irvine, CA 92618
Proposal Title: **The Clean Combustion System™ Demonstration at IPL Harding Street Station – Unit 6**

Commercial Application: [**X**] New Facilities [**X**] Existing Facilities [ ] Other

Technology Type: Advanced Coal-fired Hybrid Gasification / Combustion Process for Multipollutant Control of SO_2 and NO_x for PC coal-fired electric power generating plants.

Estimated Total Cost of Project:

Total Estimated Cost: $27.56 Million (design, construct and 1 year demonstration)
Estimated DOE Share: **$**13.17 million
Estimated Private Share: $14.39 million

Anticipated Project Site: IPL Harding Street Station, Indianapolis, and Marion County, Indiana, 46217

Type of coal to be used: Bituminous coals from local Indiana Farmersburg, Kindall and Triad mines

Size or Scale of Project: 100 MW_e generating plant; 1141.2 tons of coal /day input

Duration of Proposed Project: 28 months

Primary Contact:
For additional information, parties should contact: Gary Finchum
Project Engineer
317-788-5303 Indianapolis Power & Light Company
gary.finchum@aes.com 3700 S. Harding Street, Indianapolis, IN 46217-3333

Brief Description of Project:

Indianapolis Power & Light Company (IPL), incorporated in October 1926, provides retail electric service to more than 420,000 residential, commercial and industrial customers in Indianapolis, as well as portions of other Central Indiana communities surrounding Marion County.

IPL's dedication to the environment has never been more evident than it is today. Since 1992, our Company has spent nearly $250 million on environmental upgrades including scrubbers, low-NO_x burners and continuous emissions monitoring equipment. As a responsible business, we cannot merely appreciate the environment; we must actively work to protect it.

To this end, IPL has teamed with Phenix Limited, LLC, located in Oxnard, California to respond to the Department of Energy's Clean Coal Power Initiative (CCPI). Phenix will provide an advanced coal-combustion process technology for the in-situ control of pollutants from the burning of fossil fuels. The process, called the *Clean Combustion System*™ (CCS) is a simple hybrid of coal gasification / combustion that can meet the stringent US environmental rules for SO_2 (sulfur dioxide) and NO_x (nitrogen oxides) within the burner / boiler itself. The only " chemical reagent" required is limestone, and the ash waste products have commercial use.

All coal-fired plants can be retrofitted at low-cost to incorporate CCS and CCS qualifies as a " repowering" technology, as defined by the CAAA (P.L.-509, Section 401) " as a technology capable of controlling multiple combustion emissions simultaneously with improved boiler or generation efficiency and with significantly greater waste reduction than technologies in use."

IPL operates the Harding Street Station, a 1000 MW gas, oil, and coal fired electric generating plant located in Indianapolis, Indiana. This facility includes three coal-fired tangential design steam generators; a 400MW unit, and two 100 MW units built in 1958. These units fire the local Indiana low / medium sulfur bituminous coals. IPL must now address the stringent new Indiana NO_x SIP Call and the Clean Air Act Amendment - Title IV environmental rules with new NO_x and SO_2 emission control technology. Unit 6, one of the 100 MW tangential steam generators has been selected as the CCS demonstration unit.

The " Clean Combustion System™ Demonstration at IPL Harding Street Station – Unit 6" project proposes an estimated $27.5 million, 28-month program to engineer and modify a commercial-scale 100 MW Tangential utility boiler with the CCS technology and then conduct a 12 month full-load demonstration. This project will demonstrate a fully environmentally compliant facility that will meet both the present and proposed new stringent EPA and Clean Air Act emissions regulations. The project will directly address the CCPI solicitation objectives to: (1) demonstrate an advanced coal-based technology; and (2) accelerate its deployment to commercial use.

The features of the CCS demonstration are shown in Figure 1, entitled " CCS-Tangential. Boiler" . The project objectives are to meet President Bush's " Clear Skies" SO_2 and NO_x emission goals for 2010 when firing the local Indiana bituminous coals, as well as the immediate Indiana NO_x SIP Call, by control of the unit 6's stack pollutant emissions.
The program emissions goals are:

- √ **0.6 lb. SO2 /106 Btu or less and**
- √ **0.15 lb. NOx /106 Btu or less and**
- √ **Develop an accurate, detailed Mercury Balance across the CCS Tangential. Boiler.**

Figure 1. CCS-Tangential™ Boiler

IPL's proposed CCS-Tangential. demonstration is expected to confirm the pre-commercial application of the CCS multipollutant control process for tangential boiler designs. These emissions performance will provide IPL's unit 6 and its other tangential units, when modified with the CCS, an extended clean, competitive operating life for another 20 years.

IPL's proposed DOE-CCPI project, " **Clean Combustion System™ Demonstration at IPL Harding Street Station – Unit 6"** , will demonstrate and prove the improved use of coal, the key US natural resource, to make it a broadly available, fully-effective, and lowcost, clean energy resource for US coal-fired power plants. Further, it will provide a small, but important new contribution to the energy security for the State of Indiana. And over time, worldwide commercial applications of the CCS technology will provide other countries a greater stability and growth through clean low-cost electrical energy from coal.

PUBLIC ABSTRACT

Applicant (primary) name: Green Coal LLC

Applicant=s address: 3401 West End Ave. , Suite 500, Nashville, Tenn 37203
Street City State Zipcode

Team Members (if any): Robert Holcomb 3401 West End Ave. , Suite 500, Nashville, Tenn 37203
Name City State Zipcode

(listing represents only participants at time of application, not necessarily final team membership)

Paul Touchton 3401 West End Ave. , Suite 500, Nashville, Tenn 37203

Name City State Zipcode

Name City State Zipcode

(Use continuation sheet if needed.)

Proposal Title: Green Coal Treatment Plant.

Commercial Application: X New Facilities ÿ Existing Facilities

9 Other, Specify:

Technology Type: Fossil Energy , Coal Processing
Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 7,600,000

Estimated DOE Share: $ 3,800,000

Estimated Private Share: $ 3,800,000

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Pearl Generating Station, Pearl, IL 62361
Location (city, county, etc.) State Zipcode

Austin, MN (Possible Alternative)
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: High Sulfur Bituminous Coal; Past R&D utilized East Tennessee; Powder River Basin; Jasper, Al
Primary

Size or scale of project: 222 tons
Tons of coal/day input

Duration of proposed project: 24
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Name: Paul Touchton

Position: Principal Investigator

Telephone Number: (615) 250-1626

Company: Green Coal LLC

e-mail address: Ptouchton@demetersystems.com

Address: 3401 West End Ave. Suite 500

City State Zipcode: Nashville, TN 37203

Alternative Contact:

Name

Position

( )
Telephone Number

Company

e-mail address

Address

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Green Coal LLC, an operating company owned by Demeter Systems, LLC has developed a patented chemical that is directly applied to crushed coal in order to lower the emissions of pollutants created during the combustion and increase the efficiency of the combustion process. This new technology, called Inorganic Polymer Electret for Coal (IPE-C^{TM}), utilizes naturally occurring ingredients such as sand, water, and alkali. These ingredients are blended to yield a solution that reduces harmful emissions of sulfur dioxide (SO_2), nitrous oxide (NO_x), carbon dioxide (CO_2), carbon monoxide (CO), Hydrocarbons (HC), and mercury (Hg). With this technology, coal fired power plants would not have to retrofit facilities in order to decrease emissions. Specifically, the installation of scrubbers, selective catalytic reduction (SCR) systems, and mercury removal systems could be avoided if the technology is proven viable. The IPE-C^{TM} Process has the potential to work on all types of coal at costs significantly less than alternative technologies. However, the IPE-C^{TM} Process is most economical with high sulfur coals (>1.68% sulfur). As a pre-combustion technology, the Green Coal process can be applied at locations other than the energy plant. Providing flexibility with respect to the type of company that could benefit from the IPE-C^{TM} Process and, based on completed laboratory testing, at a lower cost for the same level of pollution reduction. In addition, although mercury emissions were not measured directly from the exhaust laboratory unit, a higher content of mercury in the ash from the treated coal suggests that the treated coal has potential for significant mercury reduction in flue gas exhaust. A market entry option for Green Coal LLC is to integrate the IPE-C^{TM} Process into coal preparation plants based on a scalable module capable of meeting the requirements of a 50 MW power generating unit. By running modules in parallel, a Green Power Coal Treatment Plant can be designed to meet the requirements of any size coal power generating plant (e.g. 250 MW plant – 5 modules). Effectiveness and feasibility of the Green Coal's treatment technology and module design will be demonstrated at the Pearl Generating Station located in Pearl, IL. The term of the project as proposed is 24 months.

PUBLIC ABSTRACT

Applicant (primary) name: Great River Energy

Applicant's address: Coal Creek Station, 2875 Third St. SW, Underwood, ND 58576-9659
Street City State Zipcode

Team Members (if any): EPRI, Palo Alto, CA 94304
(listing represents only participants at time of application, not necessarily final team membership) Name City State Zipcode

Lehigh University, Bethlehem, PA 18015-4729
Name City State Zipcode

Barr Engineering , Minneapolis, MN 55435-4803
Name City State Zipcode

Falkirk . Underwood, ND 58576
Name City State Zipcode

Proposal Title: Lignite Fuel Enhancement
Commercial Application: X New Facilities X Existing Facilities

The commercial application of the fuel enhancement technology applies to both new and existing plants

Other, Specify:

Technology Type: High Moisture Coal Enhancement by Incrementally Drying

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 22,000,000

Estimated DOE Share: $ 11,000,000

Estimated Private Share: $ 11,000,000

PUBLIC ABSTRACT (contd)

Anticipated Project Site(s): Coal Creek Station, Underwood, ND 58576-9659
Location (city, county, etc.) State Zipcode

Type of coal to be used: Lignite
Primary Alternate (if any)

Size or scale of project: 11,400 tons/day
Tons of coal/day input

And/or

546 MW Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 45
(From date of award) (Months)

PRIMARY CONTACT:

For additional information, interested parties should contact: Mr. Charles Bullinger
Name
Position Engineering Services Leader
(701) 442-7001
Telephone Number
Company Great River Energy
Cbullingers@grenergy.com
e-mail address
Address 2875 Third St SW
City, State, Zipcode Underwood, ND 58576-9659

Alternative Contact: Mr. Mark Ness
Name
Position Project Manager
(701) 442-7060
Telephone Number
Company Great River Energy
mness@grenergy.com
e-mail address
Address 2875 Third St. SW
City, State, Zipcode Underwood, ND 58576-9659

PUBLIC ABSTRACT (cont'd)

Public Abstract

LIGNITE FUEL ENHANCEMENT

Project Goal and Objectives

The goal and objective of this project is to significantly enhance the value of lignite as a fuel in electrical generation power plants within the next 5 years. Although current lignite power plants are designed to burn high-moisture coals (about 40%), a reduction in moisture content of 5 to 15 percentage points (about one quarter of the moisture content in the coal) will result in significant improvements.

All fossil steam plants reject large quantities of heat in the cooling water used to condense steam. Engineering studies at Great River Energy (GRE) Coal Creek Station show that this waste heat could be used to lower the moisture content of the coal by at least 10 percentage points (or one quarter of the moisture in the coal). Reducing the moisture content of the coal will translate into the following benefits for the U.S.:

- Increasing the net generating capacity of units that burn high-moisture coal.
- Increasing the new energy supply of units that burn high-moisture coal.
- Increasing the cost-effectiveness of the nation's electrical generation industry.
- Improving the environment by reducing emissions from coal-fired plants.
- Increasing the value of the nation's lignite reserves.

The cost benefits from improved plant performance, reduced emissions, and increased availability far out weigh the cost of drying the fuel. This work represents a potential landmark advance of fossil-steam plant performance improvement, emissions reduction and plant availability and is also applicable to Powder River Basin sub bituminous and biomass high moisture fuels as well.

Methodology

The benefits of reduced-moisture-content lignite will be demonstrated at the GRE Coal Creek Station in Underwood, North Dakota. A phased approach will be used. In the first phase, a full-scale prototype dryer module will be designed, for full power operation of one of the 546 MW units at the Coal Creek Station. Following successful demonstration of

the dryer and the performance improvements as a result of the dryer, GRE will design, construct, and perform full-scale long-term operational testing of a full suite of dryer modules for full operation of the unit on incrementally dried coal.

Sponsoring Organization

GRE is the principal project sponsor. Other collaborating organizations include Falkirk Mining and Couteau Properties, EPRI, Lehigh University and Barr Engineering. The point of contact at Great River Energy is Mr. Charles Bullinger (telephone 701-442-7001 and email cbullinger@GREnergy.com).

PUBLIC ABSTRACT

Applicant (primary) name: Green Earth Industries, LLC

Applicant=s address: 45600 Terminal Drive, Dulles, VA 20166
Street City State Zipcode

Team Members (if any): Brookhaven National Lab
(listing represents only participants at time of application, not necessarily final team membership)

(Use continuation sheet if needed.)

Proposal Title: Effect of Amino Acids on Coal Purifying Bacteria

Commercial Application: ÿ New Facilities **9** Existing Facilities

9 Other, Specify: _____

Technology Type:

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 996,900

Estimated DOE Share: $ 498,450

Estimated Private Share: $ 498,450

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): TBD

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: _____ _____

Primary Alternate (if any)

Size or scale of project: _____

Tons of coal/day input

And/or

_____ Megawatts, Barrels per day, etc.

Other (if necessary)

Duration of proposed project: 12

(From date of award) (Months)

PRIMARY CONTACT:

For additional information, James R. Holbein

interested parties should contact: Name

_____

Position

(703) 689-4675

Telephone Number

Green Earth Industries

Company

Jim.holbein@geiindustries.com

e-mail address

As above

Address

_____

City State Zipcode

Alternative Contact:

_____

Name

_____

Position

( )

Telephone Number

_____

Company

_____

e-mail address

_____

Address

_____

City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Effect of Amino Acids on Coal Purifying Bacteria

Public Abstract

The proposed project represents a modest, but important, first step in the use of amino acids to enhance the biological activity of microorganisms that convert coal into useful liquid and gaseous products that will have a minimal impact on the environment. This approach has many advantages over flue-gas desulfurization, selective catalytic and non-catalytic reduction, and other conventional applications of industrial chemistry (typically applied at the "end-of-pipe") to reduce the impact of emissions from coal-fired power generating facilities on human health and the environment. Biological treatment of coal has already demonstrated its ability to remove several compounds present in coal that are known to contribute to the production of greenhouse gases, photochemical smog, and particulate matter.

GEI is proposing a two-phase project designed to evaluate the ability of its amino acids to enhance the biologically-based treatment of coal prior to use as an energy source. Although the ability of certain microbial populations to bio-assimilate coal has been demonstrated, the need to shorten processing time and increase the yield of useful products remain obstacles remain obstacles to the ultimate commercialization of this approach. Dr. Mow Lin of Brookhaven National Laboratory (BNL) has used selected bacteria strains to treat low-grade coals as well as heavy crude oils.1 The results to-date indicate that significant amounts of nitrogen, sulfur, oxygen (NSO), and trace metals were reduced in a manner that would make the resulting treated coal a much cleaner fuel source. In the first phase of the project, GEI will collaborate with Dr. Lin to determine the effects of GEI's amino acids on microorganisms used to improve the fuel quality of coal.

The laboratory work in phase I of the project is a logical follow-on to efforts already completed by Dr. Lin. The key steps in this laboratory study are:

1. Obtain coal samples from target sites

2. Incubate coal samples with nutrients (with and without GEI's amino acids)

3. Isolate the strains that grow with the coal samples

4. Screen microorganisms for strains that improve the quality of coal with respect to NSO, and ash content.

5. Analyze for the conversion of coal into lighter fractions.

The results of these steps will provide information on the effects of nutrients in combination with GEI's amino

1 See Brookhaven article in Appendix D.

acids in improving the ability of selected strains of microorganisms to reduce the NSO and ash content of coal. This will include an evaluation of optimal conditions for using the amino acids in GEI's product as an accelerator for NSO and ash reduction.

The results of this investigation may then be used to plan and implement a commercial-scale field-test of the technology that would be the second phase of this project. This might be in the form of an open coal bed where nutrients and GEI's amino acids are applied, or in a pipeline/coal slurry injection system where the pre-treatment of coal is initiated and completed during delivery to the point of use. Although it is premature to submit a detailed Scope of Work and cost for such a project, a basic outline of the overall approach can be provided as follows:

- Examine the feasibility of several methods for using amino acids on a commercial-scale
- Select one or two candidate methods
- Pilot-test each method to establish which is better suited for a large-scale test
- Examine the engineering, economic, and environmental implications of testing the more feasible method on a commercial scale
- Plan and conduct a commercial-scale test

Because the use of amino acids in this application can have positive effects on the content of several pollutant precursors in coal, it is expected that optimizing the process will require a significant commitment of research and development time and money. The initial test should therefore have modest goals that would be guided by the results of the feasibility studies and pilot-tests. For example, it could be focused on sulfur removal.

PUBLIC ABSTRACT

Applicant (primary) name: Green Earth Industries, LLC

Applicant=s address: 45600 Terminal Drive, Dulles, VA 20166
Street City State Zipcode

Team Members (if any): University of Kansas
(listing represents only participants
at time of application, not necessarily Kansas Geological Survey
final team membership)

(Use continuation sheet if needed.)

Proposal Title: Effect of Amino Acids on Coal Bed Methane Production

Commercial Application: ÿ New Facilities 9 Existing Facilities

9 Other, Specify: _____

Technology Type:

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 568,651

Estimated DOE Share: $ 284,325

Estimated Private Share: $ 284,325

PUBLIC ABSTRACT (cont=d)

Anticipated Project Site(s): Green Earth Industries Laboratory
Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Location (city, county, etc.) State Zipcode

Type of coal to be used: _____ _____
Primary Alternate (if any)

Size or scale of project: _____
Tons of coal/day input
And/or
_____ Megawatts, Barrels per day, etc.
Other (if necessary)

Duration of proposed project: 12
(From date of award) (Months)

PRIMARY CONTACT:
For additional information, James R. Holbein
interested parties should contact: Name

_____
Position

(703) 689-4675
Telephone Number

Green Earth Industries
Company

Jim.holbein@geiindustries.com
e-mail address

As above
Address

_____
City State Zipcode

Alternative Contact:

_____
Name

_____
Position

( )
Telephone Number

_____
Company

_____
e-mail address

_____
Address

_____
City State Zipcode

PUBLIC ABSTRACT (cont=d)

Brief description of project:

Effects of Amino Acids on Coal Bed Methane Production

Public Abstract

This proposed project represents a modest, but important, first step in the use of amino acids to enhance the biological activity of microorganisms that produce natural gas from coal. This approach has many advantages over high temperature gasification, coal liquefaction, and other conventional applications of industrial chemistry to produce natural gas from coal. It is not energy intensive. It does not require many hours of labor or equipment made from exotic materials. It only requires an easily implemented and relatively low-cost modification of an existing technology (coal bed injection) used in conjunction with amino acids manufactured by Green Earth Industries, LLC (GEI).

GEI is a privately funded research and development enterprise located in Northern Virginia. Green Earth is developing commercial applications for its patent pending process to convert fish wastes into amino acids, along with fish oils, vitamins and minerals and other byproducts. One of the multitude of potential applications for the amino acids is to accelerate biological processes and enhance the effectiveness of microbes for various industrial or commercial processes. The current project proposal is designed to determine whether amino acids used in conjunction with methanogenic microbes can provide accelerated or enhanced coal bed methane production.

GEI is proposing a two-phase project designed to evaluate the ability of its amino acids to enhance the biologically-based gasification of coal. Although the ability of certain microbial populations to bio-assimilate coal has been demonstrated,1 the need to shorten processing time and increase the yield of useful products remain obstacles to the ultimate commercialization of this approach. GEI and researchers at the University of Kansas (KU) under the direction of Dr. Russell Ostermann are presently investigating the ability of GEI's amino acids to accelerate the gasification of coal and to increase the amount of natural gas, as methane, produced. Researchers at KU have established new approaches for determining appropriate mixtures of nutrients to improve biological activity. They will also characterize and quantify different components of the microbial population that contribute to the overall gasification process. The results of this work, to be completed in the end of 2002, are expected to show an improvement in methane generation while identifying the ideal mixture of microorganisms and nutrient dosage to guide an *in-situ* test of the method.

The two phases of the proposed project are a logical follow-on to the study that KU is now performing for GEI. The first phase is a series of laboratory tests that will fine-tune the results of the present investigation; it will focus on the extent to which the bio-conversion process is accelerated by application of GEI's amino acids on specific coal types. These proteins will be used in conjunction with strains of bacteria known to produce methane from coal, as determined by previous work at KU done using live cores provided by the Kansas Geological Survey. The types of coal selected for testing will be from a source or sources that are best suited

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1 Fakoussa, R.M. and M. Hofrichter, *Biotechnology and microbiology of coal degredation*, Appl Microbial Biotechnol, 52:25-40, 1999.

for future *in-situ* testing after the results of phase I are analyzed.

The phase I portion will be conducted in two steps. In the first step, the effects of nutrients in combination, with GEI's amino acids, in enhancing methane production from the variety of coal samples will be determined. This will include an evaluation of optimal conditions for using the amino acids in GEI's product as an accelerator for methane production. By the conclusion of this step, the nutrient levels and amino acid dosages that most improve methane production will become apparent.

In step two, the number and types of microorganisms present in the efficacious mixtures from step one are quantified. The results of this work will allow further determination of the optimal conditions for methane production from coal with GEI's amino acid mixture.

The second phase of the proposed project will be a series of *in-situ* tests of the communities of bacteria selected from phase I. The injection of pre-selected microorganisms and nutrients will be done with and without GEI's amino acids to determine the difference in rate and yields produced by this proprietary mixture. It is anticipated that the tests will be done in cooperation with the Kansas Geological Survey, the Tertiary Oil Recovery Project (KU) and/or a coal gas company that manages one or more locations in the Kansas region where *in-situ* coal processing would be advantageous.

The test requires a simple modification of existing coal bed injection technology to accommodate the addition of nutrients and amino acids provided by GEI. The feed mechanism is simple: a tank filled with nutrient solution/microorganisms is connected to a metering pump that will feed directly to the injection well to be distributed throughout the coal bed. GEI's amino acids can be added to the feed tank when they need to be included in the injection solution. Gas produced is monitored and analyzed for methane production.

PUBLIC ABSTRACT

Applicant (primary) name: FuelCell Energy Inc

Applicant's address: 3 Great Pasture Road, Danbury, CT 06813

Team Members (if any):
(listing represents only participants at time of application, not necessarily final team membership)

Name: Southern Company Services
City: Wilsonville
State: AL
Zip Code: 35186

Proposal Title: HIGH EFFICIENCY CLEAN COAL FUEL CELL/TURBINE POWER PLANT DEMONSTRATION

Commercial Application: New Facilities: [X] New Direct FuelCell/Turbine® Power Plant fueled by the existing coal gasification test facilities at the Power Systems Development Facility in Wilsonville, Alabama

Existing Facilities Other, Specify

Technology Type: Direct FuelCell/Turbine® Hybrid Power Plant to be operated on coal derived gas

Estimated total cost of project:
(May not represent final negotiated costs.)

Total Estimated Cost: $ 32,052,685

Estimated DOE Share: $ 16,026,342

Estimated Private Share: $ 16,026,342

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s):

Location (city, county, etc.) Danbury, Fairfield County, CT 06813
(Design, Engineering, Project Management)

Location (city, county, etc.) Torrington, Litchfield County, CT 06790
(Fuel Cell Manufacturing, Power Plant Test and Conditioning)

Location (city, county, etc.) Wilsonville, Shelby County, AL 35186
(Demonstration of Power Plant)

Type of coal to be used: Primary: Powder River Basin Sub-Bituminous

Alternate (if any): Bituminous

Size or scale of project: 2 MW Direct FuelCell/Turbine Power Plant fueled by coal derived gas

Duration of proposed project:
(From date of award) March, 2003, 40 Months

PRIMARY CONTACT:
For additional information, interested parties should contact:

Name: George Steinfeld
Position: Director/Systems Development
Telephone Number: (203) 825-6122
Company: FuelCell Energy Inc.
e-mail address: gsteinfeld@fce.com
Address: 3 Great Pasture Road
Danbury, CT 06813

Alternative Contact:

Name: Ross Levine
Position: Director of Contracts & Contracts Counsel
Telephone Number: (203) 825-6057
Company: FuelCell Energy Inc.
e-mail address: rlevine@fce.com
Address: 3 Great Pasture Road
Danbury, CT 06813

HIGH EFFICIENCY CLEAN COAL FUEL CELL/TURBINE POWER PLANT DEMONSTRATION

In response to DOE's Round 1 Clean Coal Power Initiative Program Solicitation (No. DE-PS26-02NT41428), FuelCell Energy, Inc. (FCE) proposes to design, build and test a 2 MW Direct FuelCell/Turbine® (DFC/T®) Hybrid Power Plant operating on coal derived gas.

The approach proposed for this project is to integrate an oxygen-blown transport reactor coal gasifier followed by syngas purification and partial methanation, with power generation in a Direct FuelCell/Turbine hybrid power plant which incorporates a high temperature pressurized air expander. Preliminary analysis indicates that this system can generate electricity utilizing coal on a commercial scale (200 MW) at an efficiency of over 55% (HHV basis) with 80% CO_2 separation from the coal gas and very low emissions. This efficiency level is a least 8-10% efficiency points higher than can be achieved in integrated gasification combined cycle (IGCC) power plants that can be designed today with technology anticipated to be available in 2010. Further improvements in several of the broad spectrum of technologies that DOE is sponsoring in support of the Vision 21 program have the potential to increase efficiency of the proposed system above the 60% efficiency (HHV) target level of the Vision 21 program.

This 40-month project will demonstrate the integrated operation of the proposed system utilizing the existing Transport Reactor gasifier at the Power Systems Development Facility operated by Southern Company Services in Wilsonville, AL. The gasifier will be operated in an oxygen-blown mode for this demonstration. Modular facilities will be installed at the site to clean the gas to the levels required for methanation and subsequent conversion to electricity in a modular 2 MW Direct FuelCell/Turbine hybrid power plant.

FCE is a leading developer and manufacturer of carbonate fuel cell power plants. The Company is wholly focused on the development and commercialization of its Direct FuelCell® technology, so named because of it's ability to operate directly on hydrocarbon fuels without the use of an external reformer. Currently, FCE is developing a hybrid Direct FuelCell/Turbine power plant under DOE's Vision 21 program. The objective of this Vision 21 program is to generate operational data for the design of a 40 MW high efficiency, Vision 21 power plant. FCE has also been active in the development of coal-based fuel cell power plant operation, and currently plans to demonstrate a simple cycle 2 MW coal gas fuel cell power plant under the DOE/Kentucky Pioneer Energy L.L.C. IGCC project.

Southern Company Services is a major industrial participant in the Power Systems Development Facility pilot project near Wilsonville, Alabama. This pilot project is an engineering scale demonstration of coal-powered systems with the objective of providing data for commercial scale-up.

PUBLIC ABSTRACT

Applicant (primary) name:	WMPI PTY., LLC
Applicant's address:	Main Street, Gilberton, PA 17934
Team Members (if any): (listing represents only participants at time of application, not necessarily final team membership)	Nexant, Inc., San Francisco, California 94104 Shell Global Solutions B.V., U.S., Houston, Texas 77060 Uhde GmbH., Dortmund, Germany SASOL Technology Ltd., Johannesburg, Republic of South Africa
Proposal Title:	Gilberton Coal-to-Clean Fuels and Power Co-Production Project
Commercial Application:	**X** New Facilities Existing Facilities Other, Specify:
Technology Type:	Gasification of Coal Waste Mixtures to Co-Produce Clean Transportation Fuels, Electricity and Other Value-Added By-Products
Estimated total cost of project: (May not represent final negotiated costs.)	
Total Estimated Cost:	$ 612,000,000
Estimated DOE Share:	$ 100,000,000
Estimated Private Share:	$ 512,000,000

PUBLIC ABSTRACT (cont'd)

Anticipated Project Site(s): Gilberton, Schuylkill County, PA 17934
Location (city, county, etc.) State Zipcode

The site is located near Gilberton, PA, north of Interstate 81 and east of Pennsylvania State Highway 61, off Morea Road, approximately 2 miles east of Highway 61 where it enters Frackville, PA.

Type of coal to be used: Primary - coal-derived wastes such as anthracite culm. Alternate - Pennsylvania and other coals, petroleum coke, or a combination of any of these.

Size or scale of project: Converting 4,711 tons/day of anthracite culm (40% ash) to produce 5,038 bbls/day of ultra clean fuels and 41 megawatts of power

Duration of proposed project: 6 years (72 months) from date of award

PRIMARY CONTACT:
For additional information, interested parties should contact:

Mr. John W. Rich Jr., President
WMPI PTY., LLC
Main Street, Gilberton, PA 17934
570-874-1602
jwrich@ultracleanfuels.com

Alternative Contact:

Mr. Robert Hoppe, Project Manager
WMPI PTY., LLC
Main Street, Gilberton, PA 17934
570-874-1602
rhoppe@ultracleanfuels.com

PUBLIC ABSTRACT (cont'd)

BRIEF DESCRIPTION OF PROJECT

WMPI PTY., LLC of Gilberton, Pennsylvania has assembled a world-class technology and engineering team to design, engineer, construct, and demonstrate a clean coal power facility using coal waste gasification as the basis for clean power, thermal energy and clean liquid fuels production. The Clean Coal Power Initiate (CCPI) project (DE-PS26-02NT41428) is sponsored by the U. S. Department of Energy, National Energy Technology Laboratory. In addition to WMPI, the team includes Nexant, Inc., an affiliate of Bechtel Corporation; Shell Global Solutions U.S., an international energy company with a major presence in coal gasification technology; Uhde, a global engineering company and authorized Shell gasification technology supplier and contractor, and SASOL Technology Ltd., a world leader in synthesis gas based Fischer-Tropsch Liquefaction technology.

The Gilberton Coal-to-Power and Clean Fuels demonstration plant will convert the abundant resources of low- or negative-value coal wastes scattered across the northeastern part of the United Stated into electric power and high-value, premium ultra clean transportation fuels, with minimum negative environmental impact. In addition to the minimal emissions inherent to the gasification-base technology, use of the coal wastes will help reclaiming our land and removing a serious environmental legacy from past mining practices in the United States. The Gilberton plant will gasify the coal wastes to produce a synthesis gas of carbon monoxide and hydrogen. Electric power and steam will be produced, and then a portion of the synthesis gas will be converted into synthetic hydrocarbon liquids via a catalytic chemical process known as Fischer-Tropsch (FT) synthesis.

The FT liquids of naphtha, kerosene and diesel fuels, being virtually free of sulfur, nitrogen, and aromatics, are much superior to their conventional petroleum counterparts in both end-use and environmental properties. The FT naphtha can either be upgraded to a high-Octane, clean RFG (reformulated gasoline) or use as sulfur-free onboard reforming feed (in additional to methanol) for hydrogen fuel-cell-powered vehicles applications. The FT kerosene is low in smoke point and has special application as niche-market jet fuels. FT diesels have a high Cetane Number and it has been demonstrated that they can significant reduce engine emissions in PM (particulate matter), NOx (nitrogen oxides), HC (hydrocarbon) and CO (carbon monoxide) while meeting and/or exceeding all current and expected government fuel (e.g., EPA 2006 Low Sulfur Fuels) specifications. When fully implemented, these ultra clean fuels can contribute significantly to the overall U.S. road GHG (greenhouse gas) emissions reduction.

The synthesis gas would have to be cleaned before FT synthesis, and in doing so, offering a means of removing trace metal contaminants such as mercury and producing a high purity CO_2 stream ready for sequestration if the economics permit. Other byproducts from the process include sulfur and a vitrified material resembling coarse sand that has variety of uses in the construction and building industries; both byproducts are marketable.
The proposed CCPI plant is to be built at a 75-acre WMPI site adjacent to their existing 85 MW Gilberton Power Plant that is based on circulating fluidized bed boiler technology known for its exceptional low emission characteristics when compared with conventional pulverized coal power plant. The Gilberton Power Plant has been in continuous successful commercial operation since 1986 fuel exclusively with coal waste and yet operating under the most stringent air-emissions limits. The CCPI will be fully integrated into the existing Gilberton facility to save costs and further reduce its current emissions.

The Gilberton Coal-to-Power and Clean Fuels Plant will also test and use alternative feedstocks for economic operation. These would include other coals and/or coal wastes, petroleum coke, biomass, and selected industrial/municipal wastes. Successful demonstration results will have a broad range of applications, especially in coal producing and consuming regions of the United States and North America. Commercialization of the technology will bring substantial socioeconomic benefits to the coal regions. These include direct and indirect job stimulation and the related benefits of enhanced productivity and tax revenues; environmental benefits of waste land reclamation as the coal waste is converted into high value products; and last but not least, the benefits of re-establishing North America's energy independence.

The State of Pennsylvania is enthusiastically supporting this project as evident by the passage of a 'Coal Waste Removal and Ultraclean Fuels Tax Credit' bill of 1999 in the State Assembly, offering $47 million in tax incentives for its construction cost. With demonstrated performance at Pennsylvania, WMPI expects to commercialize this clean coal gasification/liquefaction co-production concept across the United States and North America.

More facts and information on the proposed WMPI CCPI gasification/liquefaction power co-production concept can be found at www.ultracleanfuels.com.